

SOIL SURVEY

Perry County Tennessee

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UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with the
TENNESSEE AGRICULTURAL EXPERIMENT STATION
and the
TENNESSEE VALLEY AUTHORITY

How to Use THE SOIL SURVEY REPORT

FARMERS who have lived in one locality for a long time come to know about the soil differences on their own farms and on those of their immediate neighbors. What they do not know, unless a soil survey has been made, is how nearly their soils are like those at experiment stations or in other localities from which higher yields are reported. They do not know whether these higher yields are from soils like their own or so different that they could not hope to get equally high returns, even if they adopted the practices followed in these other places. These similarities and differences among soils are known only after a map of the soils has been made. Knowing what kind of soil one has and comparing it with soils on which new developments have proved successfully will remove some of the risk in trying new methods and varieties.

SOILS OF A PARTICULAR FARM

To find what soils are on any farm or other tract of land, locate the tract on the soil map, which is in the envelope inside the back cover. This is easily done by locating its boundaries by such landmarks as roads, streams, villages and other features.

Each kind of soil is marked with a symbol on the map; for example, all soils marked Hc are of the same kind. To find the name of the soil so marked, look at the legend printed near the margin of the map and find Hc. The color where the symbol appears in the legend will be the same as where it appears on the map. The Hc means Humphreys silt loam. A section of this report tells what this soil is like, for what it is mainly used, and some of the uses to which it is suited.

How productive is Humphreys silt loam? Find this soil name in the left-hand column of table 7 and note the yields of the different crops opposite it. This table also gives expectable yields for all the other soils mapped in the county, so that the different soils can be compared.

Read in the section on Descriptions of Soil Units to learn what are good uses and management practices for this soil. Look also at the section on Use Suitability, Management, and Productivity of Soils. Here the soils suited to about the same uses and management practices are grouped. Find the group (see table 6) that contains Humphreys silt loam. Read what is said about crops, crop rotations, liming, fertilizing, drainage, erosion control methods, and other management practices on this group of soils. This will apply to Humphreys silt loam.

SOILS OF THE COUNTY AS A WHOLE

If a general idea of the soils of the county is wanted, read the section on Soil Series and Their Relations. This tells where the principal kinds are found, what they are like, and how they are related to one another. Then study the soil map and read in the section on Soil Associations to learn how different kinds of soils tend to be arranged in different localities. These patterns are likely to be associated with well-recognized differences in type of farming and land use.

A newcomer who considers purchasing a farm in the county will want to know about the climate as well as the soils; the types and sizes of farms; the principal farm products and how they are marketed; the kinds of farm tenure; availability of schools, churches, highways, railroads, telephone and electric services, and water supplies; industries; and towns and population characteristics. This information will be found in the sections on General Nature of the Area and on Agriculture.

Students and others interested in how the soils of the county were formed and how they are related to the great soil groups of the world should read the section on Morphology and Genesis of Soils.

This publication on the soil survey of Perry County, Tenn., is a cooperative contribution from the—

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SOIL SURVEY OF PERRY COUNTY, TENNESSEE

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United States Department of Agriculture in cooperation with the Tennessee Agricultural Experiment Station and the Tennessee Valley Authority

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¹ The Division of Soil Survey was transferred to the Soil Conservation Service Nov. 15, 1952.

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AGRICULTURE, the principal industry of Perry County, is practiced mainly on the fertile colluvial lands and bottoms along the Buffalo and Tennessee Rivers and their tributaries. These farm lands make up about one-fifth of the county; the rest is in cut-over hardwood forest yielding cross ties, cordwood, pulpwood, chemical wood, and some grazing for livestock. Farms are of the small general type, and the value of crops grown is greater than that of livestock raised. Corn and cotton are cash crops in the southern part; peanuts, the chief cash crop in the northern part. Hay, especially lespedeza, occupies large acreages. Wheat, soybeans, cowpeas, sweetpotatoes, and white potatoes are also grown. Poultry, beef cattle, and hogs are the important livestock. In general, improved management would increase yields of crops, pasture, and forest products throughout the county.

To provide a basis for the best uses of the land a cooperative soil survey was made by the United States Department of Agriculture, the Tennessee Agricultural Experiment Station, and the Tennessee Valley Authority. Field work was completed in 1942, and, unless otherwise specifically mentioned, all statements in this report refer to conditions in the county at that time.

GENERAL NATURE OF THE AREA

LOCATION AND EXTENT

Perry County, in the western part of Tennessee (fig. 1), is bounded on the north by Humphreys County, on the south by Wayne County, on the east by Lewis and Hickman Counties, and on the west by the

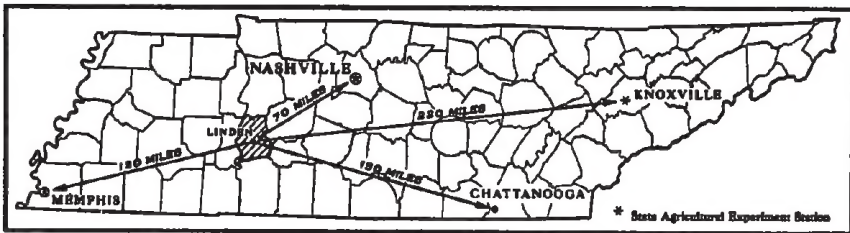


FIGURE 1.—Location of Perry County in Tennessee.

Tennessee River, which separates it from Benton and Decatur Counties. Linden, the county seat, is 70 miles southwest of Nashville and 130 miles northeast of Memphis. The county covers an area of 417 square miles, or 266,880 acres.

PHYSIOGRAPHY, RELIEF, AND DRAINAGE

Physiographically, the county is entirely within the Highland Rim section of the Interior Low Plateaus province (7).^{1a} Rock formations exposed at the surface are of sedimentary origin and include limestone, shale, and chert (fig. 2). These formations are of widely different ages and include beds deposited during Ordovician, Silurian, Devonian, Mississippian, and Quaternary periods, although most of the county is underlain by highly siliceous Mississippian limestone (9). Cretaceous gravel caps some of the highest ridges. The rocks have faulted and folded very little, and in most places they scarcely deviate from the horizontal. The differences in the character of the bedrock are reflected in the relief. Chiefly on the basis of relief and character of bedrock, four minor physiographic divisions within the Highland Rim division are recognized in the county (fig. 3). These are (1) the limestone ridge and valleys, (2) the cherty limestone hills, (3) the Tennessee River flood plains, and (4) the Buffalo River flood plains.

The limestone ridge and valleys section is characterized by an irregular drainage pattern and topography. The upper slopes are usu-

^{1a} Italic numbers in parentheses refer to Literature Cited, p. 143.

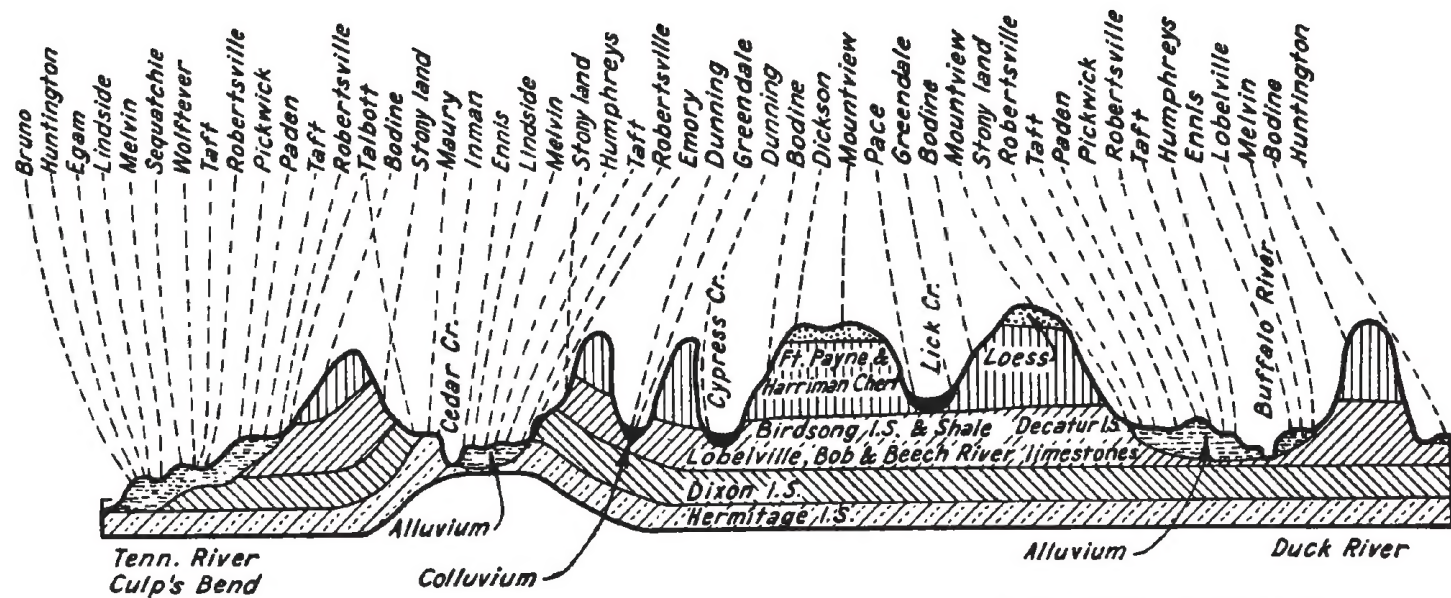
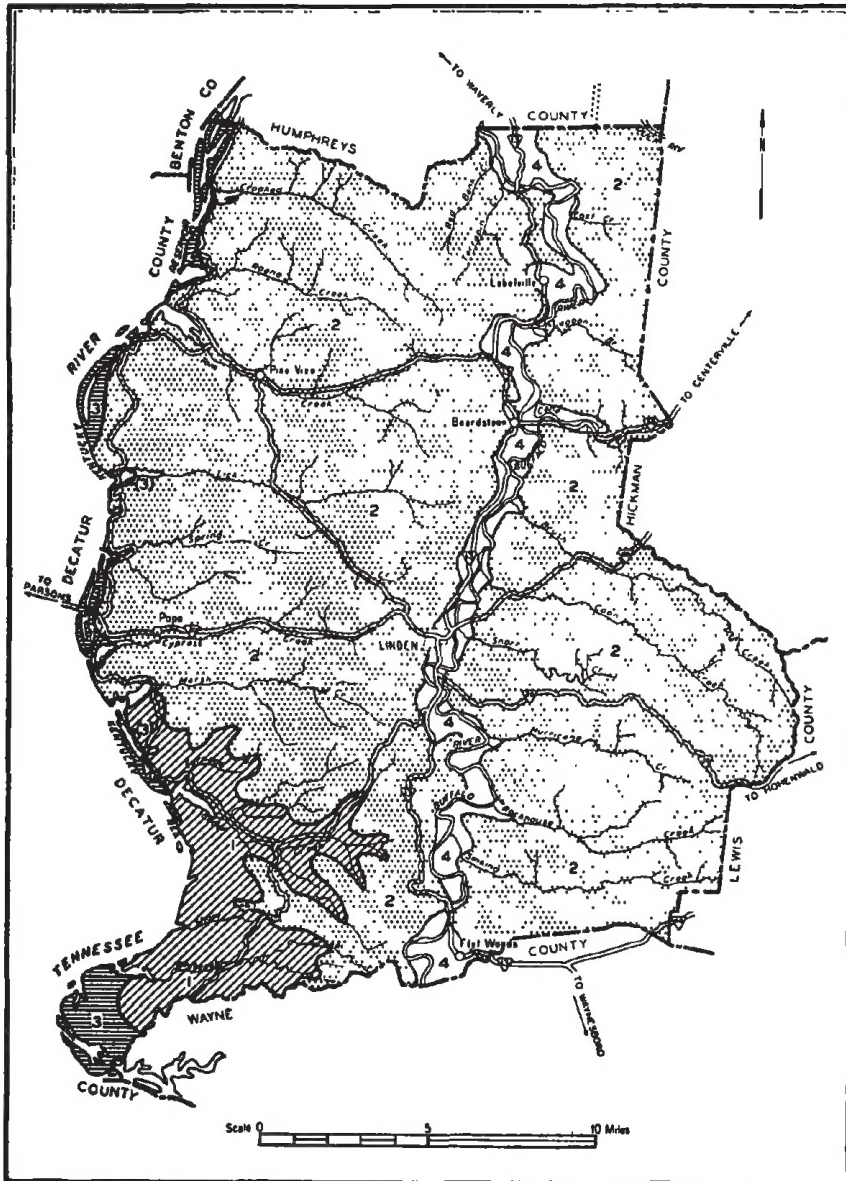


FIGURE 2.—Diagrammatic cross section of Perry County, Tenn., showing geological formations and related soils.



- | | |
|---|--|
|  Limestone Ridge & Valleys |  Tennessee River Flood Plains |
|  Cherty Limestone Hills |  Buffalo River Flood Plains |

FIGURE 3.—Physiographic divisions of Perry County, Tenn.

ally steep, but the lower slopes are sloping or gently sloping. The relief is less than 100 feet in most places, but some of the chert-capped ridges are higher. The stream valleys are broad, and the area has a larger proportion of alluvium and colluvium than the cherty limestone hills section. Excepting those on the chert-capped hills, the rock formations exposed at the surface are chiefly massive noncherty limestone.

The Hermitage, the oldest formation exposed in the county, consists of alternate beds of dense blue phosphatic limestone and dark fissile shale. On weathering, the closely associated Brassfield and Fernvale limestones give rise to similar soils, but they are insignificant in extent.

Dixon limestone, widely distributed in the county, is a greenish-gray to dark brick-red argillaceous limestone. It outcrops frequently in the limestone ridge and valley sections and along most of the streams except those in the extreme northern part of the county. The limestone of the Wayne formation, which is between the Hermitage and Dixon formations, is similar to Dixon limestone but generally of somewhat higher grade.

The Beech River, Lobelville, and Birdsong formations differ chiefly in character of fossils. All consist of thin-bedded limestone and shale, and they are the most persistent glade-forming rock formations in the county. Their outcrops are marked by barren patches of white or light-gray clay and limestone rubble upon which little grows except cedars. These formations are separated by the Bob and Decatur limestones, the outcrops of which are often marked by bluffs. The Bob limestone is a massive highly crystalline limestone varying from almost white to light gray. The Decatur limestone is a dense heavy-bedded to massive stylolitic gray to pinkish limestone (9).

The cherty limestone hills section is a thoroughly dissected upland characterized by narrow ridge crests, steep slopes, and narrow flood plains. The streams are relatively straight and swift-flowing and form a fairly regular dendritic pattern. The relief ranges from less than 100 feet in the upper stream valleys to about 300 feet in the lower valleys near the stream outlets. The character of the bedrock has influenced both the relief and the soils. The area corresponds closely to the Bodine-Ennis-Humphreys soil association, is underlain chiefly by cherty limestone, and has some exposure of massive limestone and shale.

The Harriman and Fort Payne are the most extensive formations in the county, and the soils developed from them are similar. The Harriman chert or novaculite is nearly white on fresh exposure but weathers to yellow and buff. It occurs in layers a few inches to more than a foot thick and is very hard and brittle (6). Fort Payne chert consists primarily of dense to porous chert interbedded with tripoli and siltstone of similar thickness. The tripoli and siltstone are pure white in many places but are usually stained by iron oxides (9). The Fort Payne and Harriman cherts are separated by Chattanooga black shale, which has an insignificant exposure.

Ridge top shale, at the base of the Fort Payne formation, is exposed in narrow belts along the stream valleys of the Buffalo River and its

tributaries. The formation consists chiefly of dark-gray fissile calcareous shale that weathers into a dirty gray to grayish-yellow brittle or crumbly mass of shale fragments. Remnants of the Warsaw limestone formation are exposed on a few of the higher ridge tops, but because of its limited area it is not an important soil-forming rock. A thin layer of loess is on some of the broader ridge crests in this section.

The Tennessee River flood plains section is gently undulating and consists of a natural levee near the river and low ridges and intervening swales or sloughs nearly parallel to the river. The flood plain is 10 to 25 feet above the normal level of the river and is subject to overflow. The low terraces included are 5 to 10 feet above the general level of the flood plain and are subject to overflow only at long intervals. A small acreage of high terraces is also included. This entire section, which includes the Egam-Wolftever-Lindside and the Pickwick-Paden-Etowah soil associations, is underlain by general alluvium washed from limestone, sandstone, shale, loess, and Coastal Plain sand and clay.

The Buffalo River flood plains section includes the first bottoms, low terraces (or second bottoms), and the high terraces. The river has formed many meanders and cut-offs, and the bottoms and terraces are generally on the inside of the bends (pl. 1, A). In most places, the river is undercutting the bluffs on the outside of the bends. The first bottoms are 5 to 10 feet above the river and are subject to periodic overflow; the low terraces (2 to 5 feet above the first bottoms) are overflowed at long intervals; and the high terraces—10 to 50 feet above the first bottoms and not subject to overflow—are dissected and have undulating to rolling or even steep relief. This section, corresponding to the Ennis-Humphreys-Pickwick soil association, is underlain by alluvium washed chiefly from limestone.

Relief of the county is hilly to steep, the elevation² ranging from 355 to 780 feet. The elevation at Linden is 569 feet. In general, the county has been thoroughly dissected by the drainage systems of the Buffalo and Tennessee Rivers and their tributaries.

CLIMATE

Perry County has a humid continental climate. Winters are mild with an occasional extreme cold spell; summers are hot. The average annual precipitation is 51.49 inches. Climatic conditions do not vary greatly, but the Tennessee River influences the temperature of adjacent areas to some extent. Temperature variations between seasons are not great. The difference between mean winter and summer temperatures is only 37° F. Extreme high and low temperatures are infrequent—below 0° and above 102° are considered extreme and occur on an average of once in 10 and 5 years, respectively.

The normal monthly, seasonal, and annual temperature and precipitation at the United States Weather Bureau station at Perryville, Decatur County, Tenn., are given in table 1. These data are fairly representative of weather conditions in Perry County.

² Elevations from United States Geological Survey planimetric maps.

TABLE 1.—*Normal monthly, seasonal, and annual temperature and precipitation at Perryville, Decatur County, Tenn.*

[Elevation, 430 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total for the driest year	Total for the wettest year	Average snow-fall
	° F	° F	° F	Inches	Inches	Inches	Inches
December.....	41. 2	75	—3	5. 32	2. 45	6. 63	2. 0
January.....	40. 2	77	—10	5. 16	2. 64	3. 19	1. 4
February.....	42. 0	78	—3	4. 13	1. 26	5. 62	2. 2
Winter.....	41. 1	78	—10	14. 61	6. 35	17. 14	5. 6
March.....	51. 4	91	13	5. 50	1. 53	7. 80	. 8
April.....	59. 4	92	23	4. 68	2. 38	14. 80	(¹)
May.....	68. 1	99	35	4. 23	1. 10	3. 62	0
Spring.....	59. 6	99	13	14. 41	5. 01	26. 22	. 8
June.....	75. 9	106	41	4. 23	1. 41	5. 67	0
July.....	79. 6	113	48	3. 99	6. 76	8. 16	0
August.....	78. 9	113	48	3. 96	4. 43	3. 40	0
Summer.....	78. 1	113	41	12. 18	12. 60	17. 23	0
September.....	73. 2	111	32	3. 09	. 13	3. 10	0
October.....	61. 0	97	23	3. 42	3. 50	2. 65	(¹)
November.....	49. 9	87	8	3. 78	3. 15	2. 07	. 3
Fall.....	61. 4	111	8	10. 29	6. 78	7. 82	. 3
Year.....	60. 1	113	—10	51. 49	² 30. 74	³ 66. 71	6. 7

¹ Trace.² In 1941.³ In 1912.

In neither winter nor summer are temperatures so extreme as to interfere seriously with outside farm work. A variety of winter crops are grown on the well-drained soils with little danger of winterkilling, even though they receive no effective protection from a blanket of snow. There is some damage from heaving on poorly drained and heavy-textured soils and on the more severely eroded soils. Most of this damage, however, results because the plants do not get a vigorous start before cold weather.

The average frost-free period of 193 days, extending from April 11 to October 21, gives ample time for growing and maturing practically all the important field crops. Killing frosts have occurred as late as May 10 and as early as September 22, but frost in September is extremely rare, and one early in May is to be expected about every 5 years. Frost seldom damages corn, peanuts, and cotton, but late spring frosts frequently damage the fruit crop and lespedeza, the chief hay crop. Early fall frosts often damage corn planted late in the season on poorly drained bottom soils. The grazing period extends from



A, Flood plain of the Buffalo River.
B, Dry gravelly stream bed in the cherty limestone hills section.
C, Fair pasture on Bodine cherty loam, hilly phase.



A, Small portable sawmill used for cutting lumber and cross ties.
B, Hogs on open range.

about the last of March to the first of November. Some winter cover crops are grazed in winter, especially late in winter or early in spring.

The mean annual rainfall of 51.49 inches is fairly well distributed. The lightest precipitation in summer and fall coincides with the ripening and harvesting of the crops. Though ample for the most moisture-exacting crops of the county, much of the rainfall is lost through surface runoff. The long winter rains are usually slow, but during spring and summer, short heavy downpours are common. Snows are usually light and last only a few days.

Droughts that severely damage crops are uncommon, but lack of rain causes some injury almost every year on certain soils. Spring droughts are rare, but lack of moisture often becomes pronounced in July and August because of the short heavy rains and excessive evaporation resulting from high temperatures. Periods of drought during the fall seeding period are frequent and they damage winter cover crops. They may kill the stand or delay its growth until it becomes susceptible to winterkilling.

Wet periods frequently prevent farm operations in winter and spring. On the well-drained soils of the uplands these wet spells are more detrimental in delaying seeding than in reducing yields. On the imperfectly and poorly drained soils, however, the seeding may be delayed until yields are materially lowered. Except on poorly drained soils or those with sluggish surface drainage, crops are seldom damaged by excessive rainfall after they are growing. Spring flooding of the small creek bottoms sometimes damages growing crops. At rare intervals the Tennessee River overflows its flood plain during the growing season or before the crops have been harvested. Hay crops such as red clover are frequently damaged severely by extended wet periods at harvesttime. Excessive rainfall does somewhat reduce yields but is detrimental mainly because it encourages weed growth. The greater number of tillage operations necessary to kill the weeds increases production costs.

Southwesterly winds of mild velocity are frequent in March and April. Summer and fall are usually calm with few mild breezes, but cold northerly winds are common in winter. Winds seldom reach a velocity sufficient to do any great damage, and tornadoes are extremely rare. Damaging storms accompanied by high winds occur at long intervals, usually early in spring.

WATER SUPPLY

Practically all parts of the county have an ample supply of water. Springs, shallow wells, and, on some of the higher ridges, cisterns furnish the water for human consumption. Water for livestock is obtained from the many streams along which most of the farmsteads are located. During extended dry spells the water in many of these small streams flows below the loose chert in the stream bed, but usually water can be found in deep holes (pl. 1, *B*).

VEGETATION

About 80 percent of the county is forested, chiefly with hardwood. A few pine and a considerable number of cedar are present. The principal species are post, Spanish or scarlet, white, bur, chestnut, and pin oaks, hickory, hornbeam, elm, hackberry, tuliptree (yellow-poplar),

sassafras, sweetgum, black tupelo (blackgum), sycamore, honeylocust, black locust, maple, redbud, ash, persimmon, redcedar, and cypress. Mulberry, dogwood, birch, hackberry, sourwood, willow, and cottonwood are less important (8). The timbered areas of the county are discussed in more detail in the section on Forests.

ORGANIZATION AND POPULATION

Permanent settlers began to arrive in the territory now occupied by Perry County soon after it was acquired from the Indians in 1806. The county was organized from a part of Hickman County in 1821, and until 1846 it included a part of Decatur County (11). Perryville, now in Decatur County, was the first county seat. When Decatur County was established in 1846, the county seat of Perry County was moved to Bethel (then Harrisburg) and in 1848 to Linden (13).

The early settlers were largely from the adjoining counties of middle Tennessee, although there were a few from the adjacent States, especially North Carolina, Alabama, and Kentucky. According to Federal census data the population of the county was 6,462 in 1950. The average density of population was 15.4 persons per square mile in 1950. Linden, the only town, then had a population of 854.

INDUSTRIES, TRANSPORTATION, AND MARKETS

The inhabitants of the county depend largely upon agriculture for their livelihood. There are no factories, but various small sawmills employ several men, and during the winter many farmers cut cross ties or do other timber work (pl. 2, 4).

Transportation facilities are fair. There are no railroads. The Tennessee River offers excellent water transportation but is not utilized to any extent for local shipping.

There are four State highways. State highway No. 100 crosses the county from east to west, No. 13 crosses from north to south, No. 20 connects Linden with Hohenwald in Lewis County, and No. 50 connects Beardstown with Centerville in Hickman County. Well-maintained gravel roads throughout the county provide easily traveled routes to markets.

Regular truck and bus service is maintained on highway No. 100. Grocery trucks reach nearly all parts of the county at least once a week. These trucks and the scattered general merchandise stores accept poultry and other farm products in trade. Most farm products, including corn, cattle, hogs, hay, and peanuts, are hauled from farm to market by truck.

Market facilities for farm products are limited. Linden is the chief market and trading center, but most of the farm products sold are transported to Nashville, a distance of 70 miles. Formerly, a large part of the farm products were shipped from the river landings. Now, practically none are shipped by water. Many forest products are shipped by water to Paducah, Ky., and the other large riverside markets.

SCHOOLS, CHURCHES, AND PUBLIC FACILITIES

Small elementary schools are conveniently located. Two high schools, at Linden and Lobelville, are served by school busses that

transport students from nearly all sections of the county. Practically all communities have churches.

According to the 1945 Federal census, there were 91 telephones on farms in the county and 105 rural users of electric power. Rural mail routes serve all parts of the county, and only a few farm families are more than a mile from these routes.

AGRICULTURE

Agriculture in the early days, as now, was the main industry. Prior to 1806 the Indians practiced a crude agriculture that consisted chiefly of corn production. After the Indians ceded their claim, the fertile bottom lands and the abundance of water, timber, and game attracted the white settlers. The settlers grew primarily subsistence crops. Corn was the principal staple crop, as it was well adapted to virgin land, quick to mature, and easy to harvest and store. Horses, cattle, sheep, and hogs were raised for local needs.

As the county became more thickly populated and transportation facilities improved, more land was cleared and cultivated. More corn, peanuts, and livestock were produced and shipped by river to outside markets. Also, there was an increase in cash crops and a proportionate decrease in subsistence crops. Corn and peanuts were the most important crops; cotton, the leading cash crop; and oats, rye, and potatoes, less important crops.

CROPS

The farms of Perry County are of the small general type. Peanuts are the chief cash crop in the northern part; corn, fed chiefly to hogs, and cotton are the cash crops in the southern part (12). The value of crops grown is considerably greater than the value of livestock and livestock products raised. Corn, hay, and peanuts are the main crops; cotton, soybeans, cowpeas, wheat, sweetpotatoes, and Irish potatoes are lesser ones. Although the largest acreage is in corn, peanuts are the most important cash crop.

The acreages of the principal crops of Perry County in stated years are given in table 2, on page 12.

Corn, the chief field crop, is grown both as a subsistence and a cash crop. Most of the corn is grown on the first bottom soils, as Huntingtor, Lindside, Ennis, and Lobelville. The average yield was about 28 bushels an acre in 1944. For the period 1920 to 1944 the average was 26.6 bushels. Average yields on the first bottom soils are well above this, whereas those on the less fertile upland soils are much less. Tennessee Red Cob, Neal Paymaster, and Jarvis Golden Prolific are the most commonly grown varieties.

Hay is second to corn in acreage and its production has not changed significantly. Lespedeza was not commonly grown before 1920 but is now the principal hay crop. The Korean variety is most used.

A considerable acreage of soybeans and cowpeas and small acreages of redtop, timothy, red clover, and alfalfa are cut for hay. Although hay crops are grown on practically all of the tillable soils in the county, the largest acreage is on the Humphreys, Pickwick, Paden, Wiltfaver, Taft, and such terrace soils. Annual legumes, soybeans, and cowpeas are grown extensively on the poorly and imperfectly

TABLE 2.—*Acreage of the principal crops and number of fruit trees¹ in Perry County, Tenn., in stated years*

Crop	1919	1929	1939	1944
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
Corn for grain.....	20, 300	16, 916	16, 589	14, 050
Wheat threshed.....	657	(²)	49	206
Oats threshed.....	47	(²)	20	49
Dry edible beans.....	5	1, 071	³ 17	³ 2, 442
Dry peas.....	8	453	⁴ 8	⁴ 8
Peanuts.....	2, 374	4, 365	686	2, 210
Cotton.....	443	648	226	315
Potatoes.....	19	140	156	114
Sweetpotatoes.....	32	109	92	123
All hay.....	5, 814	4, 151	6, 999	4, 334
Annual legumes cut for hay.....	3, 305	2, 487	2, 230	2, 258
Lespedeza.....	(²)	(²)	4, 117	1, 762
Timothy and clover, alone or mixed.....	781	767	318	111
Alfalfa.....	5	3	89	63
Grains cut green.....	1, 314	451	185	8
Other cultivated grasses.....	408	358	56	79
Wild grasses.....	1	85	4	53
Sorghum cane for sirup.....	273	107	57	(²)
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Peaches.....trees.....	9, 633	7, 214	7, 758	10, 764
Apples.....do.....	6, 712	4, 907	4, 210	6, 060
Plum and prunes.....do.....	4, 983	1, 309	737	2, 738

¹ Number of fruit trees of bearing age given for all years except 1944; the 1944 figures are for trees of all ages.

² Not reported.

³ Soybeans.

⁴ Cowpeas.

drained Melvin, Lindside, and Lobelville soils of the first bottoms. Most of the hay is fed to livestock on the farm where it is grown and that which is sold is fed locally.

Peanuts yielded 1,715,182 pounds on 2,210 acres in 1944. Most of the peanuts are grown on the Humphreys, Ennis, and Greendale soils.

The cotton acreage has always been small and in recent years even this small acreage has been further reduced. The cotton is ginned and marketed largely in Decatur County because there is no cotton gin in Perry County.

A small acreage of the small grains is now grown. In the past larger acreages were grown chiefly for grain for home use or for hay. Small grains have been largely replaced by peanuts and legume hay crops. In 1944, there were 49 acres of threshed oats, 359 acres of unthreshed oats, 206 acres of threshed wheat, 93 acres of threshed barley, and 76 acres of threshed rye.

Soybeans and cowpeas are grown for both seed and forage. In 1944, about 8 acres of cowpeas were grown alone, and 71 acres with other crops. In the same year 2,442 acres of soybeans were grown alone, and 1,643 acres with other crops. The acreage of soybeans has increased rapidly in the last few years. Soybeans are commonly interplanted with corn and hogged off after the corn has been harvested.

Sweetpotatoes and Irish potatoes are widely grown as subsistence crops. Practically no potatoes are grown for market, and the total acreage is small. A small acreage of sorghum cane is grown on the imperfectly and poorly drained soils of the terraces and bottom lands. The sorghum is made into sirup, chiefly for home use. In 1944, the sorghum grown for all purposes except sirup totaled 193 acres.

Truck crops, as string beans, okra, spinach, mustard, turnips, onions, cabbage, beets, carrots, cucumbers, and lettuce, are grown chiefly for home use. Apples and peaches are the most common fruits, but some pears, plums, cherries, strawberries, and blackberries are grown. Any surplus fruit is sold locally.

The acreage of permanent pasture is extremely small because open range is grazed (pl. 2, B), and because cleared land is used in short rotations. Short rotations are practiced because the acreage of crop-adapted land is limited. Livestock graze along highways and streams, in woods, and on all land not fenced. Some of the steep slopes adjoining the bottoms, especially along the Buffalo River, are in pasture. Most permanent pasture is of fair quality and occupies Dandridge, Talbott, and Bodine soils. The principal pasture plants seeded alone and in mixtures are bluegrass, redtop, timothy, Bermuda grass, hop clover, white clover, and lespedeza. A mixture of clover and grass is usually sown, but after a few years the stand consists chiefly of bluegrass.

AGRICULTURAL PRACTICES

Differences in soil types, soil-distribution patterns, relief, and size of farms govern agricultural practices. Modern machinery is generally used on the larger farms of the broad creek and river bottoms, but tillage of the hilly areas and the small farms is usually performed with one- or two-horse implements. The small-grain crop is generally harvested with small combines, as is the seed of the legume crops such as lespedeza, crimson clover, vetch, and soybeans. Cotton and corn are practically all harvested by hand.

Most of the small grain crops—wheat, rye, oats, and barley—are planted in fall and harvested in June or July. Part of the oat crop, however, is planted early in spring. Crimson clover, vetch, and other legumes are sown in fall and plowed under in April or May or harvested for seed in June. Timothy and red clover are sown in fall or early in spring. Corn is generally planted during April and May, although some is planted as late as June 20. Cotton is planted from about May 1 to 10, and peanuts, from April 20 to May 20.

LIVESTOCK AND LIVESTOCK PRODUCTS

Perry County has always had open range, and cropland occupies only a small part of the total area. The farms have been able to carry a large number of livestock in proportion to the acreage of cropland. Cattle and hogs are the chief livestock other than work animals. A few sheep and goats are also raised.

The number of livestock in the county in stated years is given in table 3.

TABLE 3.—*Number of domestic animals in Perry County, Tenn., in stated years*

Livestock	1920	1930	1940	1945
Horses.....	551	350	¹ 320	243
Mules.....	2, 241	1, 991	¹ 1, 600	1, 269
Cattle.....	5, 936	3, 584	¹ 4, 525	5, 906
Sheep.....	1, 272	1, 401	² 981	1, 031
Goats.....	411	400	² 527	789
Swine.....	17, 791	10, 907	² 10, 995	11, 068
Poultry.....	59, 134	35, 877	² 30, 427	41, 531

¹ Over 3 months old.² Over 6 months old.³ Over 4 months old.

Beef cattle are principally of Hereford and Shorthorn breeds. There is a trend toward increased production of better quality beef animals through the use of better bred sires. Most of the beef cattle are hauled by truck to the Nashville market, but the total volume of sales is not great. The total number of cattle was 5,906 in 1944, and of this 1,253 were cows and heifers milked.

Swine are generally of high grade or purebred. The most common breeds are Poland China, Duroc, Chester White, and Hampshire. Most of the hogs not used at home are hauled by truck to the Nashville market.

The principal breeds of sheep are Hampshire and Southdown. Wool and lambs are marketed mainly in Nashville. Few goats are raised but their number is gradually increasing.

Since 1920, there has been a fairly rapid decrease in the total number of work stock, probably owing to replacement by tractors. In 1945, 693 farms reported a total of 1,512 work animals, an average of 2.2 a farm.

Although farm flocks are small, poultry is still an important source of farm income. Chickens make up the major part of the total number of poultry. The most common general-purpose breeds of chickens are Barred Rock, White Rock, Rhode Island Red, White Wyandotte, and Orpington; the White Leghorn is the most common laying breed.

TYPES AND SIZES OF FARMS

The farms were classified in 1945 by type and total value of farm products sold, traded, or used by farm household as follows: Livestock farms, 305; farms producing products primarily for own household use, 294; field-crop farms, 146; general farms, 71; forest-products farms, 35; poultry farms, 9; and dairy farms, 4. There were 7 unclassified farms.

The census for 1945 classifies the farms according to size as follows:

Acres:	Number of farms	Acres:	Number of farms
Under 3.....	33	180 to 219.....	60
3 to 9.....	57	220 to 259.....	29
10 to 29.....	80	260 to 379.....	97
30 to 49.....	85	380 to 499.....	47
50 to 69.....	71	500 to 699.....	32
70 to 99.....	70	700 to 999.....	14
100 to 139.....	101	1,000 or more.....	6
140 to 179.....	89		

The more progressive agricultural communities occur where the soils are best suited to agriculture. For example, where First- and Second-class soils³ predominate, a large percentage of the farm houses are well-built and equipped with many modern conveniences, most of the fences are well-built and well-maintained, and the farms are relatively well-equipped with modern farm machinery. Such evidence of prosperous agriculture is most apparent in the Buffalo River bottoms, where there is a high percentage of Ennis and Humphreys soils, most of which are First- and Third-class soils. Along the smaller creeks, where the percentage of these better soils is much less and the farms consist largely of Fourth- and Fifth-class Bodine soils, farming appears less profitable, although prosperous farms do occur. In general the agricultural prosperity of the area seems to be closely associated with the amount of improved cropland per farm (pl. 3).

LAND USE

Before 1806 the area now in Perry County was almost completely covered with forest. The change from forest to crops and pasture, rapid at first, was almost completed by 1880. Some land, however, is still being cleared and put into crop production, and other areas are reverting to forest. There were 44,919 acres of improved land on farms in 1920 and 33,908 acres in 1945. Land in farms totaled 56.6 percent of the county area in 1920 and 55.0 percent in 1945. In 1920 the average size of farms was 142.9 acres; in 1945 the average had increased to 169.3 acres. Improved land per farm was 36.4 percent in 1920 and 23 percent in 1945.

There was 147,490 acres of land in farms in 1945, and of this 26,326 acres was cropland harvested, idle, or failure; 7,582 acres was in cropland pastured; 3,416 acres was woodland pastured; 8,857 acres was other land pastured; and the rest was in woodland or used for other noncrop purposes.

FARM TENURE

In 1945, 73.4 percent of the farms in the county were operated by owners and 26.5 percent by tenants. Few farms have ever been operated by managers.

The three classes of tenants are the cash renter, the share renter, and the share cropper. The cash renter pays the owner a stipulated cash rent per acre, and because little land is rented this way, no definite rental prices have been established. The share renters, the largest group of renters, furnish all of labor, equipment, work stock, and seed and give the landlord a fourth of the cash crops and a third of the feed crops. The landlord sometimes furnishes fertilizer in proportion to the share of the crop he receives. The share cropper furnishes all the labor and half of the fertilizer and seed and gets half of all the crops.

FARM EXPENDITURES

Expenditure for feeds was reported for 727 farms (83.5 percent of all farms) in 1945. The total was \$145,599, or an average of \$200.27 for each farm reporting. Some hay is purchased, but the expenditure is mostly for tankage, cottonseed meal, and like protein supplements and for shorts, bran, and mixed feeds.

³ See pages 93 to 96 for definitions of soil classes.

In 1945, cash expenditure for hired labor was reported for 37.2 percent of the farms in the county; the average for the farms reporting was \$161.21.

Because the crops are grown largely on alluvial soils, the need for fertilizer has not been so great in this county as in adjoining ones where much of the crop acreage is on soils of the uplands. In 1930, use of fertilizer was reported for 6.4 percent of the farms in the county, and the total cost was \$1,346. This was a considerable increase over the amount purchased in previous census years. In 1939, only 16 tons of commercial fertilizer and 584 tons of liming material were purchased, but this did not include phosphate or lime obtained through the Agricultural Adjustment Administration. Expenditures for lime and fertilizer were not reported in the 1945 census.

SOIL SURVEY METHODS AND DEFINITIONS

Soil surveying consists of the examination, classification, and mapping of soils in the field. The soil scientist walks over the area at intervals not more than a quarter mile apart and bores into the soil with an auger or digs holes with a spade. Each boring or hole reveals a series of distinct soil layers, or horizons, termed collectively the soil profile. Each of these layers is studied carefully for the physical and chemical characteristics that affect plant growth.

The color of each layer is noted. The darkness of the topmost layer is usually related to its content of organic matter; streaks and spots of gray, yellow, and brown in lower layers generally indicate poor drainage and poor aeration.

Texture, or the content of sand, silt, and clay in each layer, is determined by the feel and is checked by mechanical analysis in the laboratory. Texture has much to do with the quantity of moisture the soil will hold available to plants, whether plant nutrients or fertilizers will be held by the soil in forms available to plants or will be leached out, and how hard the soil may be to cultivate.

Structure, or the way the soil granulates, and the amount of pore or open space between particles indicate how easily plant roots can penetrate the soil and how easily water enters it. Consistence, or the tendency of the soil to crumble or to stick together, indicates how difficult it is to keep the soil open and porous under cultivation.

The kind of rock from which the soil has been developed, or its parent material, affects the quantity and kind of plant nutrients the soil may contain.

The chemical reaction of the soil and its content of lime and salts are determined by simple chemical tests.⁴ The depth to bedrock or

⁴ The reaction of the soil is its degree of acidity or alkalinity, expressed mathematically as the pH value. A pH value of 7 indicates precise neutrality; higher values, alkalinity; and lower values, acidity. Terms referring to reaction and commonly used in this report are defined in the Soil Survey Manual (10) as follows:

	pH		pH
Extremely acid.....below	4.5	Neutral.....	6.6-7.3
Very strongly acid.....	4.5-5.0	Mildly acid.....	7.4-8.0
Strongly acid.....	5.1-5.5	Strongly alkaline.....	8.1-9.0
Medium acid.....	5.6-6.0	Very strongly alkaline..	9.1 and higher
Slightly acid.....	6.1-6.5		

The presence of lime in the soil is detected by the use of a dilute solution of hydrochloric acid.



- Prosperity of farms along streams, expressed by farm buildings, fences, and farm equipment, is closely related to the quantity of improved cropland per farm.
- A*, Farmstead in the upper stream valley on Greendale, Pace, and Ennis soils, where cropland is limited.
- B*, Farmstead downstream on Greendale, Humphreys, Ennis, and Pace soils, where the flood plain is broader and the quantity of cropland larger.
- C*, Farmstead in the lower stream valley on Humphreys, Ennis, Greendale, and Pace soils, where the proportion of cropland is large.

to compact layers is determined. The quantity of gravel or rocks that may interfere with cultivation, the steepness and kind of slope, the quantity of soil lost by erosion, and other external features are observed.

Soil areas much alike in the kind, thickness, and arrangement of layers are mapped as one soil type. Some soil types are separated into two or more phases. For example, if a soil type has slopes that range from 2 to 15 percent, it may be mapped in two phases, an undulating phase (2- to 5-percent slopes), and a rolling phase (5- to 15- percent slopes). A soil that has been eroded in places may be mapped in two or more phases, an uneroded, or normal, phase (denoted by the name of the soil type only), an eroded phase, and perhaps a severely eroded phase. A soil type will be broken into phases primarily because of differences in the soil other than those of kind, thickness, and arrangement of layers. The slope of a soil, the frequency of outcropping bedrock, the extent of erosion, or artificial drainage are examples of characteristics that might cause a soil type to be divided into phases.

Two or more soil types may have similar profiles; that is, the soil layers may be nearly the same, except that the texture, especially of the surface layer, will differ. As long as the other characteristics of the soil layers are similar, these soils are considered to belong in the same soil series. A soil series therefore consists of all the soil types that have about the same kind, thickness, and arrangement of layers, except for texture, particularly of the surface layer, whether the number of such soil types be only one or several.

The name of a place near where a soil series was first found is chosen as the name of the series. Paden is the name of a moderately well drained siltpan soil series found on high terraces in Perry County, Tenn. Two types of the Paden series are found—Paden silt loam and Paden silty clay loam. These differ in the texture of the surface soil, as their names show. Paden silt loam is divided into four phases because some of it is rolling, some is undulating, and some is eroded. These phases are Paden silt loam, undulating phase; Paden silt loam, eroded undulating phase; Paden silt loam, rolling phase; and Paden silt loam, eroded rolling phase.

Bare rocky mountainsides, gravel pits, and like areas having little true soil are not designated with series and type names but are given descriptive names, such as Stony rough land (Talbot and Colbert soil materials); Mines, pits, and dumps; and Riverwash.

The soil type, or where the soil type is subdivided, the soil phase, is the unit of mapping in soil surveys. It is the unit or the kind of soil most nearly uniform and narrowest in range of characteristics. For this reason land use and soil management practices can be more definitely specified for it than for broader groups of soils that contain more variation. One can say, for example, that soils of the Paden series are low in organic matter, plant nutrients, and water-holding capacity and are very strongly acid. It can be added that they respond to good management practices when used for production of field crops. More specific statements can be made for the less inclusive units in the Paden series. It can be said that Paden silt loam, eroded undulating phase, has mild slopes and is suited to row crops grown in a rotation with a small grain and hay; whereas Paden silty clay

loam, severely eroded rolling phase, is no longer suited to crop production because it is severely eroded, a condition indicating improper use and poor management.

SOILS

The well-developed soils of Perry County are confined to uplands and high terraces and have developed in an environment of moderately high temperature, heavy rainfall, and forest vegetation. The soils, particularly those of the uplands, have been severely leached and are therefore acid in reaction, low in fertility, and low in organic matter. They differ in fertility and in content of organic matter, even in the virgin state, and such differences have been increased by cropping, erosion, and other artificially stimulated processes of impoverishment. In contrast to the soils of the uplands and high terraces, or high benches, many of the soils of the bottoms and low terraces, or second bottoms, are high in natural fertility. Many are moderately well supplied with bases, especially lime, and fairly well supplied with organic matter.

The soils differ in color, texture, consistence, depth to the underlying material, reaction, fertility, relief, stoniness, permeability, and drainage. They exhibit all shades from nearly white through gray, yellow, and brown to red. Brown to light-gray colors predominate in the surface soil, and red and yellow in the subsoil.

In texture and consistence the range is from loose incoherent sands to tough tenacious clays. Predominantly, surface soil is silt loam and loam, whereas subsoil is chiefly silty clay loam and cherty silty clay loam. Surface soil is, for the most part, mellow and friable, and subsoil ranges from friable to very strongly plastic.

In fertility and reaction the soils vary greatly. Although most of them are strongly to very strongly acid, a significant number are only slightly to medium acid. Some of the soils are very low in natural fertility and others are relatively high, but most of them are intermediate between the two extremes. The content of organic matter is generally not high, but the soils differ considerably in this respect.

The soils are prevailingly rolling to hilly, but they range from nearly level to steep. The degree of accelerated erosion varies from uneroded or slightly eroded to moderately eroded and severely eroded. There is a small acreage of rough gullied land.

Tilth is mostly favorable, but some surface soils puddle, bake, and clod when tilled under unfavorable moisture conditions. With relatively few exceptions, such refractory surface soils have resulted because original surface layers have been eroded away. Many of the soils contain gravel, chert, stone, or outcrops, that interfere materially with cultivation. Loose fragments of chert or limestone outcrops are common in most of the soils developed over limestone. A few soils contain bedrock outcrops.

Most of the soils are well drained, but some are poorly drained or imperfectly drained. A conspicuous development in some of the soils of the upland and terraces having gentle slopes is a compact layer, generally referred to as a siltpan or claypan. The compact layer is usually at a depth of 2 feet, but in some soils it may be at a shallower depth.

Because the soils differ in characteristics, their relative suitability for use in the present agriculture differs. Those highly productive and easy to work and conserve are very well suited to agricultural uses; whereas those low in productivity and difficult to work and conserve are unsuited or very poorly suited. Most of the soils, however, are between these two extremes. On the basis of differences in productivity, workability, and conservability, the soils have been grouped into five classes, which are discussed in the section on Use Suitability Classes.

SOIL SERIES AND THEIR RELATIONS

To make full use of this soil survey it is necessary to know the soils and to understand their relations to each other. The soils of this county are placed in 28 soil series on the basis of color, consistence, drainage, character of parent material, relief, erosion and other characteristics. To facilitate understanding their relations, these soil series are grouped according to their position on the landscape and to their parent material. The four main groups are (1) soils of uplands, (2) soils of terrace lands, (3) soils of colluvial lands, and, (4) soils of bottom lands. These main groups are subdivided according to source of parent material. The main groups and subdivisions of those groups are discussed in the following pages, and the principal characteristics of the 28 soil series are presented in table 4.

SOILS OF UPLANDS

Soils of the uplands occur above stream valleys, have developed from residual material (material left in the weathering of the underlying sedimentary rocks or loess), and have properties generally closely associated with the character of the underlying rock formations. There are three classes of underlying material for soils of the uplands in this county—loess (wind-blown silt), limestone, and interbedded limestone and shale or shale. Accordingly, soils of the uplands are placed in three subgroups as follows: (1) Soils derived from a thin silt mantle; (2) soils derived from limestone and (3) soils derived chiefly from shale.

SOILS DERIVED FROM A THIN SILT MANTLE

The Dickson, Sango, and Mountview soils have developed from a thin layer of wind-blown silt. They are characterized by yellowish-gray silt loam surface soil and yellowish-brown or brownish-yellow silty clay loam subsoil, underlain by cherty limestone residuum. Differences among the soil series are closely related to differences in drainage. The Dickson and Sango soils are moderately well drained and have a siltpan at a depth of about 2 feet; the well-drained Mountview soils do not have a siltpan. The Dickson soil is somewhat better drained than the Sango and has yellowish-brown to brownish-yellow subsoil, whereas the Sango soil has brownish-yellow to pale-yellow subsoil.

SOILS DERIVED FROM LIMESTONE

Soils of the Bodine, Talbott, and Maury series are derived from limestone. The Bodine, readily identified by the large number of angular chert fragments on the surface and throughout the profile,

TABLE 4.—*Principal characteristics of the soil series of Perry County, Tenn.*

SOILS OF UPLANDS				
Soil series	Parent material or substratum	Relief	Drainage	General color grouping
Dickson.....	From unconsolidated wind deposits (loess) underlain by— Cherty limestone below 24 to 42 inches.	Undulating to rolling....	Moderately good ¹	Brownish yellow or yellowish brown, free of mottlings to 20 to 24 inches.
Sango.....	do.....	Nearly level to undulating.	Imperfect ²	Pale-yellow subsoil with some mottlings, strongly mottled below 12 to 16 inches.
Mountview.....	Cherty limestone below 10 to 24 inches. From unconsolidated water deposits of—	Undulating to hilly....	Good.....	Brown or reddish brown, free of mottlings to 36 inches or more.
Talbott.....	Clayey limestone.....	do.....	do.....	Do.
Bodine.....	Cherty limestone.....	Hilly to steep.....	Excessive ³	Indistinct profile; color varies with parent material.
Maury.....	Phosphatic limestone.....	Undulating to hilly....	Good.....	Brown or reddish brown, free of mottlings to 36 inches or more.
Inman.....	Interbedded phosphatic limestone and shale.	Hilly to steep.....	Excessive ³	Indistinct profile; color varies with parent material.
Dandridge.....	Calcareous shale.....	do.....	do.....	Do.
Needmore.....	do.....	Undulating to hilly....	Good.....	Brown or reddish brown, free of mottlings to 36 inches or more.
SOILS OF TERRACE LANDS				
Pickwick.....	Old general alluvium on— High terraces; loess mantle over alluvium washed chiefly from soils derived from limestone.	Undulating to hilly....	Good.....	Brown or reddish brown, free of mottlings to 36 inches or more.

Paden.....	do.....	Undulating to rolling..	Moderately good ¹ ..	Brownish yellow or yellowish brown, free of mottlings to 20 to 24 inches.
Taft.....	High terraces; loess mantle over alluvium washed chiefly from soils derived from limestone. Low terraces; alluvium washed chiefly from soils derived from limestone.	Nearly level to undulating.	Imperfect ²	Pale-yellow subsoil with some mottlings, strongly mottled below 12 to 16 inches.
Robertsville.....	do.....	Nearly level.....	Poor ⁴	Light gray or yellowish gray with some mottlings of brown, yellow, or yellowish white below 6 to 8 inches.
Etowah.....	High terraces; alluvium washed chiefly from soils derived from limestone.	Undulating to hilly....	Good.....	Brown or reddish brown, free of mottlings to 36 inches or more.
Wolftever.....	Low terraces; alluvium washed chiefly from soils derived from limestone.	Undulating to rolling..	Moderately good ¹ ..	Brownish yellow or yellowish brown, free of mottlings to 20 to 24 inches.
Sequatchie.....	Low terraces; alluvium washed chiefly from soils derived from limestone and sandstone.	Undulating to hilly....	Good.....	Brown or reddish brown, free of mottlings to 36 inches or more.
Humphreys.....	Low terraces; alluvium washed chiefly from soils derived from cherty limestone.	do.....	do.....	Do.

SOILS OF COLLUVIAL LANDS

Greendale.....	Local alluvium and some colluvial material—Recent alluvium washed from soils derived from cherty limestone.	Undulating to hilly....	Good.....	Brown to brownish gray, free of mottlings to 24 inches or more.
Pace.....	Older alluvium washed from soils derived from cherty limestone.	do.....	do.....	Do.

See footnotes at end of table.

TABLE 4.—*Principal characteristics of the soil series of Perry County, Tenn.—Continued*

SOILS OF COLLUVIAL LANDS—Continued

Soil series	Parent material or substratum	Relief	Drainage	General color grouping
Emory.....	Local alluvium and some colluvial material—Continued Alluvium washed from soils derived from limestone.	Undulating to hilly....	Good.....	Brown to brownish gray, free of mottlings to 24 inches or more.

SOILS OF BOTTOM LANDS

Huntington.....	General alluvium on stream bottoms washed from soils underlain by— Chiefly limestone.....	Undulating to hilly....	Good.....	Brown to brownish gray, free of mottlings to 24 inches or more.
Lindside.....	Chiefly limestone (slack-water deposits).	Nearly level to undulating.	Imperfect.....	Grayish brown to brownish gray, mottled below 12 inches.
Melvin.....	Limestone, cherty limestone, and limestone (slack-water deposits).	Nearly level.....	Poor.....	Brownish gray to light gray, mottled below 6 to 8 inches.
Egam.....	Chiefly limestone (slack-water deposits).	Undulating to hilly....	Good.....	Brown to brownish gray, free of mottlings to 24 inches or more.
Dunning.....	Clayey limestone.....	Nearly level to undulating.	Imperfect.....	Grayish brown to brownish gray, mottled below 12 inches.
Bruno.....	Chiefly sandstone.....	Undulating to hilly....	Good.....	Brown to brownish gray, free of mottlings to 24 inches or more.
Ennis.....	Cherty limestone.....	do.....	do.....	Do.
Lobelville.....	do.....	Nearly level to undulating.	Imperfect.....	Grayish brown to brownish gray, mottled below 12 inches.

¹ Drainage retarded by siltpan; soil saturated for short periods within 12 inches of surface.² Drainage retarded by siltpan; soil saturated much of time within 12 inches of surface.³ Surface drainage, rapid to very rapid; internal drainage, slow to very rapid.⁴ Drainage greatly retarded by siltpan or claypan; soil saturated much of the time.

are shallow soils with indistinct layers, or horizons, and occur on relatively steep ridge slopes in most places. The Talbott soils, derived from the residuum of clayey limestone, and characterized by yellowish-red strongly plastic subsoil, are relatively free of chert but have outcrops of bedrock in most areas. The Maury soil, derived from the residuum of phosphatic limestone, has brown surface soil and reddish-brown moderately plastic subsoil. It is deeper, browner, and more friable than the associated Talbott soils.

SOILS DERIVED CHIEFLY FROM SHALE

Soils of the Inman, Dandridge, and Needmore series are derived chiefly from shale. The shallow Inman soil is characterized by shale particles on the surface and throughout the profile. It is derived from the residuum of interbedded phosphatic limestone and shale. Although closely associated with the Maury soil, it differs in being shallow over bedrock, lighter in color, and heavier in texture. It has grayish-brown silt loam surface soil and brownish-yellow strongly plastic silty clay subsoil that is splotched with gray and yellow in most places.

The shallow Dandridge soils are also characterized by shale particles throughout the profile. They are lighter in color and texture than the Inman soil, having a grayish-yellow surface soil and a brownish-yellow friable light silty clay loam subsoil. Like the Needmore soils, the Dandridge have developed from the residuum of calcareous shale.

The Needmore soils differ from the Dandridge in being deeper over bedrock and in having more distinct surface soil and subsoil layers. In Perry County they are on ridge crests or rolling ridge slopes, whereas the Dandridge soils are on hilly or steep ridge slopes.

SOILS OF TERRACE LANDS

The rivers and streams of this county once flowed at considerably higher levels and deposited gravel, sand, and clay on their flood plains. Stream cutting, which has continued a great number of years, has gradually deepened channels, and new flood plains have formed at lower levels. The remnants of the older higher lying flood plains, now above the overflow stage of the present streams, are called terrace land. Geologically, terrace land (frequently referred to as second bottoms or benches) consists of general stream alluvium that lies above the overflow stage of the present streams.

On the basis of differences in the origin of their parent materials, the soils of the terrace lands are grouped as (1) soils derived from old alluvium washed from soils underlain by a variety of materials, partly limestone, (2) soils derived from old alluvium washed chiefly from soils underlain by cherty limestone material, and (3) soils derived from old mixed alluvium washed chiefly from soils underlain by sandstone.

SOILS DERIVED FROM OLD ALLUVIUM WASHED FROM SOILS UNDERLAIN BY A VARIETY OF MATERIALS, PARTLY LIMESTONE

The Etowah, Pickwick, Paden, Taft, Robertsville, and Wolftever soils are derived from old alluvium washed from soils of the uplands underlain by a wide variety of rocks, including shale, sandstone, limestone, loess, and Coastal Plain sand and clay. Limestone materials, however, are believed to be predominant in most of the alluvium.

The Pickwick, Paden, and in part, the Taft and Robertsville soils are on high terraces of the Tennessee and Buffalo Rivers. These high terraces are covered in most places with a thin layer of loess. The well-drained Pickwick soils are identified by their friable reddish-brown gravel-free subsoil. The moderately well drained Paden soils have a yellowish-brown or brownish-yellow subsoil and a siltpan at a depth of about 2 feet. The imperfectly drained Taft soil has a pale-yellow subsoil and a strongly developed siltpan. The poorly drained Robertsville soil is predominantly light gray throughout. The Taft and Robertsville soils also occur in association with Wolftever and Sequatchie soils of the low Tennessee River terraces.

The Etowah soils, similar to the Pickwick in color and drainage but derived from alluvium washed chiefly from soils underlain by limestone, are readily identified by the gravel on the surface and throughout the profile.

Wolftever soils are on the younger and lower terraces and are subject to occasional overflow. They have a silt loam surface soil, a compact yellowish-brown or brownish-yellow subsoil, and moderately good drainage.

SOILS DERIVED FROM OLD ALLUVIUM WASHED CHIEFLY FROM SOILS UNDERLAIN BY CHERTY LIMESTONE MATERIAL

The Humphreys soils, occurring on low terraces along streams in the cherty limestone hills section, are derived from alluvium washed chiefly from soils of uplands underlain by cherty limestone. Chert fragments are usually in the profile, although Humphreys silt loam has a relatively chert-free surface soil. The brown well-drained Humphreys soils occur in association with Ennis soils of the first bottoms. The small acreage of poorly drained and imperfectly drained soils of the terraces is associated with the Humphreys soils but is included in the Robertsville and Taft series.

SOILS DERIVED FROM OLD MIXED ALLUVIUM WASHED CHIEFLY FROM SOILS UNDERLAIN BY SANDSTONE

The old alluvium from which the Sequatchie soils are derived is washed from soils underlain by a wide variety of materials, including limestone, shale, loess, and Coastal Plain sand and clay. Materials from sandstone apparently predominate. The Sequatchie are brown well-drained soils of low terraces subject to occasional overflow. They are closely associated with the Wolftever soils on the Tennessee River terraces but differ from them in being brown and sandy throughout the profile.

SOILS OF COLLUVIAL LANDS

The soils of colluvial lands—the Greendale, Pace, and Emory—are located along small drainageways; at the base of upland slopes, particularly the longer slopes on which erosion has been active; and on small sloping alluvial-colluvial fans where the small streams have deposited their load over the broad flood plains of larger streams. The parent materials of these soils are derived from soil material and rock fragments washed and rolled from adjacent slopes that are underlain by limestone. The Emory soil is associated chiefly with the Maury and Talbott; the Greendale and Pace soils, chiefly with the Bodine and Dickson.

The parent material of Greendale and Pace soils comes chiefly from cherty limestone, but the Greendale soils are very young and do not have well-defined surface soil and subsoil layers, whereas the older Pace soils do. The Greendale are grayish-brown well-drained young soils characterized by many chert fragments on the surface and throughout the profile. The Pace soils are moderately well drained to well drained, have a grayish-brown cherty silt loam surface soil and a yellowish-brown friable cherty silty clay loam subsoil, and are cherty throughout the profile.

The parent material of the Emory soil is from noncherty relatively high grade limestone. Emory soil is brown, friable, and well drained and differs from the Greendale soils in being relatively free of chert, browner, and heavier textured.

SOILS OF BOTTOM LANDS

Bottom lands are the flood plains or nearly level areas along streams that are subject to floods. The material giving rise to soils of the bottom lands has been carried to its present location by the streams. The character of this material depends largely upon its source in the higher lying lands and the rate at which water was moving when the material was deposited. The soils in the bottoms are young; their material has not lain in place long enough for the development of well-defined surface soil and subsoil layers such as those found in most soils of the uplands and terraces.

On the basis of differences in parent materials the soils of the bottom lands are subgrouped as (1) soils derived from mixed alluvium washed from soils underlain partly by limestone, (2) soils derived from alluvium washed chiefly from soils underlain by sandstone, and (3) soils derived from alluvium washed chiefly from soils underlain by cherty limestone material.

SOILS DERIVED FROM MIXED ALLUVIUM WASHED FROM SOILS UNDERLAIN PARTLY BY LIMESTONE

Soils of the Huntington, Egam, Lindsides, Dunning, and Melvin series consist of material washed from soils of uplands and underlain by a wide variety of rocks. Material washed from soils developed over limestone predominates.

The Huntington soil is brown, friable, and well drained and occurs chiefly on the low first bottoms. The Egam soil is dark grayish brown, compact, moderately well drained, and is chiefly on high first bottoms. The brown to grayish-brown Lindsides soils are imperfectly drained, and the brownish-gray or gray Melvin soil is poorly drained. The imperfectly or poorly drained Dunning soil, dark grayish-brown or almost black, has a tough strongly plastic consistence. It is chiefly on the flood plains of the Tennessee River or along tributary streams in the Talbott-stony land-Lindsides soil association.

SOILS DERIVED FROM ALLUVIUM WASHED CHIEFLY FROM SOILS UNDERLAIN BY SANDSTONE

The Bruno soils consist of materials washed from soils of the uplands underlain by a variety of rocks, the material from Coastal Plain sand and sandstone predominating. These soils occupy first bottoms—natural levees in most places—along the Tennessee River. They are characterized by an extremely sandy texture.

**SOILS DERIVED FROM ALLUVIUM WASHED CHIEFLY FROM SOILS UNDERLAIN BY
CHERTY LIMESTONE MATERIAL**

Soils of the Ennis and Lobelville series consist of material washed chiefly from Bodine soil and deposited on the flood plains of streams in the cherty limestone hills section. The light-brown well-drained Ennis soils are characterized by varying quantities of chert fragments on the surface and throughout the profile. The Lobelville are grayish-brown or light-brown imperfectly drained soils mottled below depths of 12 to 18 inches.

DESCRIPTIONS OF SOIL UNITS

In the following pages the soils of Perry County, identified by the same symbols as those appearing on the soil map, are described in detail and their relation to agriculture, including present use and management, use suitability, and management requirements, are discussed. Their distribution is shown on the accompanying map, and their acreage and proportionate extent are given in table 5.

**TABLE 5.—Acreage and proportionate extent of the soils mapped in
Perry County, Tenn.**

Soil	Acres	Percent
Bodine cherty loam:		
Eroded hilly phase.....	1, 423	0. 5
Eroded rolling phase.....	403	. 2
Eroded steep phase.....	1, 858	. 7
Hilly phase.....	4, 095	1. 5
Rolling phase.....	30, 315	11. 4
Steep phase.....	119, 889	45. 1
Bruno fine sandy loam.....	537	. 2
Bruno loamy fine sand.....	38	(¹)
Dandridge silt loam:		
Eroded hilly phase.....	839	. 3
Eroded steep phase.....	715	. 3
Hilly phase.....	928	. 3
Severely eroded hilly phase.....	302	. 1
Steep phase.....	2, 062	. 8
Dickson silt loam, rolling phase.....	1, 341	. 5
Dunning silty clay loam.....	302	. 1
Egam silty clay loam.....	794	. 3
Emory silt loam.....	1, 710	. 6
Ennis cherty loam.....	5, 870	2. 2
Ennis silt loam.....	7, 547	2. 8
Etowah gravelly silt loam:		
Eroded rolling phase.....	286	. 1
Hilly phase.....	306	. 1
Severely eroded hilly phase.....	269	. 1
Greendale cherty loam:		
Rolling phase.....	1, 040	. 4
Undulating phase.....	11, 874	4. 4
Humphreys cherty loam.....	1, 286	. 5
Eroded phase.....	2, 191	. 8
Hymphreys silt loam.....	2, 996	1. 1
Eroded phase.....	2, 083	. 8
Huntington silt loam.....	470	. 2
Inman silty clay loam, eroded hilly phase.....	269	. 1
Lindside silt loam.....	1, 901	. 7
Lindside silty clay loam.....	280	. 1
Lobelville cherty silt loam.....	783	. 3

¹ Less than 0.1 percent.

TABLE 5.—*Acreage and proportionate extent of the soils mapped in Perry County, Tenn.—Continued*

Soil	Acres	Percent
Lobelville silt loam.....	503	. 2
Maury silty clay loam, eroded rolling phase.....	318	. 1
Melvin silt loam.....	2, 594	1. 0
Mines, pits, and dumps.....	27	(¹)
Mountview silt loam:		
Eroded hilly shallow phase.....	328	. 1
Eroded rolling shallow phase.....	1, 103	. 4
Hilly shallow phase.....	637	. 2
Rolling shallow phase.....	12, 253	4. 6
Mountview silty clay loam, severely eroded rolling shallow phase.....	201	. 1
Needmore silt loam:		
Eroded rolling phase.....	480	. 2
Rolling phase.....	414	. 2
Pace cherty silt loam:		
Eroded rolling phase.....	2, 046	. 8
Eroded undulating phase.....	608	. 2
Rolling phase.....	682	. 3
Severely eroded rolling phase.....	425	. 2
Paden silt loam:		
Eroded rolling phase.....	637	. 2
Eroded undulating phase.....	1, 778	. 7
Rolling phase.....	201	. 1
Undulating phase.....	202	. 1
Paden silty clay loam, severely eroded rolling phase.....	597	. 2
Pickwick silt loam:		
Eroded rolling phase.....	1, 424	. 5
Eroded undulating phase.....	487	. 2
Rolling phase.....	128	(¹)
Pickwick silty clay loam:		
Severely eroded hilly phase.....	34	(¹)
Severely eroded rolling phase.....	919	. 3
Riverwash.....	112	(¹)
Robertsville silt loam.....	727	. 3
Rough gullied land (Talbott soil material).....	373	. 1
Sango silt loam.....	390	. 1
Sequatchie fine sandy loam.....	295	. 1
Eroded phase.....	179	. 1
Stony hilly land (Talbott and Colbert soil materials).....	2, 035	. 8
Stony rolling land (Talbott and Colbert soil materials).....	481	. 2
Stony rough land (Talbott and Colbert soil materials).....	8, 061	3. 0
Taft silt loam.....	2, 180	. 8
Talbott silt loam, rolling phase.....	425	. 2
Talbott silty clay loam:		
Eroded hilly phase.....	272	. 1
Eroded rolling phase.....	514	. 2
Severely eroded rolling phase.....	295	. 1
Talbott stony silty clay loam:		
Eroded hilly phase.....	1, 055	. 4
Eroded rolling phase.....	592	. 2
Eroded steep phase.....	536	. 2
Hilly phase.....	5, 545	2. 0
Rolling phase.....	861	. 3
Severely eroded hilly phase.....	716	. 3
Steep phase.....	3, 242	1. 2
Wolftever silt loam.....	1, 268	. 5
Wolftever silty clay loam, eroded phase.....	698	. 3
Total.....	266, 880	100. 0

¹ Less than 0.1 percent.

Bodine cherty loam, hilly phase (Bd).—This excessively drained soil developed from the residuum of cherty limestone under a deciduous forest. Post and blackjack oaks are the most common trees on the upper slopes, whereas white and red oaks and hickory are common on the lower slopes. The soil is widely distributed throughout the cherty limestone hills section. The areas occur on 15- to 30-percent slopes of narrow winding ridges in association with Dickson, Greendale, Humphreys, and Ennis soils.

The soil is strongly to very strongly acid; low in fertility, water-holding capacity, and organic matter; and high in permeability to air, roots, and moisture. Both external and internal drainage are rapid to very rapid. A great number of angular chert fragments are on the surface and throughout the profile.

Profile description:

0 to 12 inches, brownish-gray to yellowish-gray cherty loam or cherty silt loam, 8 to 14 inches thick.

12 inches +, weakly cemented very cherty brownish-yellow loam or clay loam highly mottled with red, yellow, gray, and brown; 5 feet or more thick.

The soil varies considerably within short distances, especially in the degree to which surface soil and subsoil layers have developed. In many places, particularly at the foot of slopes where some colluvial material has accumulated, the surface layer is as much as 18 inches thick. Also included are areas having a cherty moderately distinct silt loam surface soil and moderately distinct subsoil layers. The number of chert fragments in the soil varies considerably, but the quantity is usually sufficient to interfere materially with cultivation. The parent material in many places includes a small quantity of wind-blown silt that somewhat influences the texture of the surface soil. Some small areas have a darker surface soil and a yellowish-red subsoil.

Present use and management.—Practically all of the hilly phase of Bodine cherty loam is in forest that has been cut over many times. The stand now contains little marketable timber. Most areas burn frequently, and many forested areas are grazed.

Use and management requirements.—Low fertility, low water-holding capacity, chertiness, and strong slopes make Bodine cherty loam, hilly phase, very poorly suited to crops requiring tillage. It is not naturally productive of pasture, but indications are that fair pasture can be established and maintained under good management (pl. 1, C). Lime and phosphate are generally required to establish the pasture mixture, and a top dressing of phosphate each year aids in maintaining productivity. The expense of clearing the land may not be justified by the low-carrying capacity of the pasture. Many areas are probably best left in forest, and their management will be concerned chiefly with increasing the yield and quality of timber (see the section on Forests).

Bodine cherty loam, eroded hilly phase (BA).—A large number of angular chert fragments on the surface and throughout characterize this excessively drained shallow soil. It has developed under a deciduous forest vegetation on 15- to 30-percent slopes and differs from the hilly phase chiefly in being eroded. The parent material consists of the residuum of very cherty limestone. The areas are comparatively

small and are scattered throughout the cherty limestone hills section. The soil occurs on ridge slopes and is associated chiefly with Dickson soils of uplands, Greendale and Pace soils of colluvial lands, Humphreys soils of low terraces, and Ennis soils of bottom lands. It is strongly to very strongly acid and low in organic matter, plant nutrients, and water-holding capacity.

Profile description :

0 to 8 inches, brownish-gray to grayish-yellow friable cherty loam or cherty silt loam up to 12 inches thick.

8 inches +, weakly cemented very cherty brownish-yellow loam or clay loam highly mottled with red, yellow, gray, and brown; 5 feet or more thick.

Because the soil has eroded unevenly, the depth of the surface layer varies greatly. In some places the original surface soil has been lost to such extent that the subsoil is reached by tillage implements. Where this occurs, subsoil is incorporated in the surface layer remaining and gives it a yellowish color. Chert fragments have accumulated on the surface as erosion progressed, and therefore the eroded areas have more chert than those not eroded. Within short distances variations occur in texture, in degree of textural development, and in thickness of the surface soil and subsoil layers. Some areas are included that have darker surface soil and reddish subsoil. A few areas have been so severely eroded that they have lost most of their surface layer. The chertiness of the plow layer varies somewhat, but in practically all places there is sufficient chert to interfere materially with tillage.

Present use and management.—All of Bodine cherty loam, eroded hilly phase, has been cleared and used for field crops. Most of it is now idle or wasteland, although some is used for pasture. Fertilization and crop rotation are not commonly practiced. The soil is cleared, used for row crops until yields become unprofitably low, and then abandoned or used for unimproved pasture. Under the management commonly practiced, crop and pasture yields are very low.

Use and management requirements.—The eroded hilly phase of Bodine cherty loam is very poorly suited to intertilled field crops. Although it is naturally unproductive, it is suitable for pasture if lime and phosphate are applied to establish and maintain the stand of forage plants. Nitrogen fertilizer may be needed to establish the pasture mixture, but if legumes are included in the mixture, they should fix the needed nitrogen after the pasture is well established. Even under good management, pasture yields are low. The growth of the pasture plants is greatly retarded during the dry summer and fall months, chiefly because the soil has a low water-holding capacity.

Bodine cherty loam, steep phase (Br).—This soil differs from the hilly phase in having a steeper slope (30 to 60 percent) and in being more variable, especially in thickness of surface soil and subsoil layers. It has developed under a deciduous forest vegetation from residuum of highly cherty limestone. Large areas are distributed throughout the cherty limestone hills section in association with other Bodine soils. A considerable number of chert fragments $\frac{1}{2}$ to 3 inches in diameter and sharply angular are on the surface and throughout the profile.

The soil is very permeable, and both internal and external drainage are rapid to very rapid. The content of organic matter and plant nutrients and the water-holding capacity are low.

Profile description:

0 to 12 inches, brownish-gray to yellowish-gray friable cherty loam or cherty silt loam, 8 to 16 inches thick.

12 inches +, weakly cemented very cherty brownish-yellow loam or clay loam highly mottled with red, yellow, gray, and brown; 5 feet or more thick.

A few areas are included that have darker surface soil and reddish subsoil.

Present use and management.—Practically all of the Bodine cherty loam, steep phase, is in forest. Some small areas adjacent to open cropland and pasture land are cleared and used for pasture, but yields are very low, even under good management.

Use and management requirements.—The steep phase of Bodine cherty loam is not suited to crops requiring tillage and is poorly suited to pasture. Although it is best suited to forest, some farmers, of necessity, use this soil for pasture. The north- and east-facing slopes are more productive of pasture than the south- and west-facing slopes. The lower slopes are generally more productive than the upper. Lime, phosphate, and possibly potash are needed to establish and maintain fair pasture.

Bodine cherty loam, eroded steep phase (Bc).—Small areas of this soil are widely distributed throughout the cherty limestone hills section in association with Dickson, Greendale, Pace, Humphreys, Ennis, and other Bodine soils. The soil has developed from the residuum of cherty limestone. It is cherty throughout, and because the finer soil particles have been removed by erosion, there is an accumulation of chert on the surface. Chert drifts have formed on lower slopes in many places. The relief ranges from 30 to 60 percent. As a result of accelerated erosion, a considerable part of the original surface layer and, in a few places, some of the subsoil have been lost. Shallow gullies and exposures of subsoil are common and conspicuous.

Both external and internal drainage are rapid to very rapid. The soil is strongly to very strongly acid and very low in organic matter, plant nutrients, and water-holding capacity.

Profile description:

0 to 8 inches, brownish-gray to grayish-yellow friable very cherty loam or cherty silt loam, 0 to 12 inches thick.

8 inches, +, weakly cemented cherty brownish-yellow loam or clay loam highly mottled with red, yellow, gray, and brown; 5 feet or more thick.

The surface layer varies greatly in color and thickness, because the loss of soil through erosion is uneven and because the subsoil is in places mixed with remnants of the original surface soil. Included are areas varying considerably in the quantity of material lost through erosion, in the degree of chertiness, and in size of chert fragments. In some eroded areas practically all the surface layer has been lost and shallow gullies are common.

Present use and management.—All the eroded steep phase of Bodine cherty loam has been cleared and used for crops or pasture, but most of it is now temporarily idle or abandoned. A few areas are in unimproved pasture, but the yield is very low.

Use and management requirements.—Bodine cherty loam, eroded steep phase, is very poorly suited to crops and pasture (pl. 4, A) and

is best suited to forest. Pasture is difficult to maintain; the loose chert tends to accumulate on the lower slopes. Reforestation will be difficult, for it will require such advance preparation, as plowing contour furrows, building check dams and diversion ditches, mulching, and application of some fertilizer. After such preparation, shortleaf and loblolly pines make fair growth. Black locust trees grow well in the fill material behind check dams. For a discussion of reforestation, see the section on Forests.

Bodine cherty loam, rolling phase (B_E).—This very cherty soil occupies 5- to 15-percent slopes in the highly dissected cherty limestone hills section. The areas, long and winding, occur chiefly on the crests of high ridges. The soil has developed from the residuum of cherty limestone under a deciduous forest of post and blackjack oaks. It is associated chiefly with Dickson, Sango, or other Bodine soils.

The soil is cherty throughout and there is enough chert in its plow layer to interfere materially with tillage. It is very permeable, has rapid internal drainage and moderate external drainage, and is strongly to very strongly acid. The organic-matter content, plant-nutrient content, and water-holding capacity are low.

Profile description:

0 to 12 inches, brownish-gray to yellowish-gray friable cherty loam or cherty silt loam, 8 to 14 inches thick.

12 inches +, weakly cemented brownish-yellow cherty loam or cherty clay loam highly mottled with gray, red, yellow, and brown; 10 feet or more thick.

Some areas too small to map separately are included with this soil. They have well-developed surface soil and subsoil layers and are similar to the Nixa soils in nearby counties. A few small areas of Mount-view soils, differing from the Bodine soils chiefly in having a chert-free plow layer, are also included, as are some areas with reddish subsoil.

Present use and management.—Practically all of Bodine cherty loam, rolling phase, is still forested. Most of the forest has been cut over several times, and the little marketable timber remaining is of poor quality and grows slowly. Most forests burn over every few years, and many are grazed.

Use and management requirements.—Chertiness, low fertility, and low water-holding capacity make the rolling phase of Bodine cherty loam poorly suited to crops. Other factors contributing to poor suitability are unfavorable distribution on narrow winding ridges in association with soils unsuited to cultivation, the difficulty of access, and occurrence in irregular-shaped areas. Under good management, including adequate fertilization and a careful selection of crops, fair yields can be expected. Lime, phosphate, and possibly potash are needed for practically all crops; nitrogen fertilizer is needed for all crops except legumes and the crops immediately following legumes. Drought-resistant crops that will grow on soils of low water-holding capacity or crops that mature in a season of high rainfall should give the best results.

This soil is probably better suited to pasture than to crops. Reasonably good pasture can be established and maintained if lime and phosphate are used. The soil dries out rapidly after rains, especially in hot weather, and consequently the productivity of pasture plants will be low late in summer and in fall. If the soil is properly fertilized, productivity should be fairly high in spring.

Bodine cherty loam, eroded rolling phase (Ba).—A substantial part of the original surface soil has been eroded from this phase. The thin surface layer of higher organic-matter content has been lost, and there has been some mixing of material in the plow layer. From the rolling phase this one differs chiefly in being eroded. The soil has developed under a deciduous forest vegetation from the residuum of cherty limestone. It occupies small areas on 5- to 15-percent ridge crests or ridge slopes throughout the cherty limestone hills section and is closely associated with Sango, Dickson, Mountview, and other Bodine soils.

The soil is cherty throughout and there is enough chert in the plow layer to interfere materially with tillage. It is very permeable, and internal drainage is rapid. Surface runoff is relatively low, and erosion control is not a serious problem. Organic-matter content, plant-nutrient content, and water-holding capacity are low, and the reaction is strongly to very strongly acid.

Profile description:

0 to 8 inches, brownish-gray to grayish-yellow friable cherty loam or cherty silt loam, up to 12 inches thick.

8 inches +, weakly cemented very cherty brownish-yellow loam or clay loam highly mottled with red, yellow, gray, and brown; 10 feet or more thick.

Some small areas are included that have well-developed surface soil and subsoil layers similar to those of the Nixa soils in nearby counties. Some inclusions differ in having a reddish subsoil, and a few are severely eroded. In use and management requirements these inclusions do not differ significantly from the eroded rolling phase.

Present use and management.—All the eroded rolling phase of Bodine cherty loam has been cleared and used for crops or pasture. About 50 percent of the soil has been abandoned, a small acreage is in crops, and the rest is in unimproved pasture. Fertilizers are not commonly used, and yields of both crops and pasture are very low.

Use and management requirements.—Bodine cherty loam, eroded rolling phase, is considered physically suited to crop production, but owing to low fertility and low water-holding capacity, crop yields are very low. The response to fertilization and other good management practices is highly variable because of droughtiness. Management should be concerned chiefly with supplying the elements in which the soil is deficient—lime, nitrogen, phosphorus, and possibly potash. Pasture is the best use on most farms. Fair pasture has been established in a few places by seeding a mixture of legumes and grasses on land properly limed and phosphated. Even under good management, however, yields are low in the dry summer and fall months.

Bruno fine sandy loam (Ba).—Long narrow areas of this soil are on natural levees or low first bottoms of the Tennessee River, some of which are flooded by the Kentucky Reservoir. The mixed alluvium from which this soil formed was washed predominantly from uplands underlain by sandstone or unconsolidated sand. Associated with this soil are the Huntington, Lindside, Melvin, Sequatchie, and Wolftever soils. The soil has developed under a forest vegetation chiefly of oak, elm, beech, maple, ash, and sycamore. Relief is nearly level to very gently sloping. Slopes do not exceed 3 percent. Surface drainage is moderate, but internal drainage is moderate to rapid.



- A, Pasture on Bodine cherty loam, eroded steep phase.
 B, Good bluegrass pasture on Dandridge silt loam, eroded hilly phase, that has been maintained over a long period without the use of amendments.
 C, The gently undulating Tennessee River flood plain consists of low ridges and intervening swales or sloughs. Egam soil is on the high bottoms (left), Melvin soil in the swales (center), and Wolftever soils on the low terraces (right).



- A, Both Humphreys silt loam in background on low stream terraces and Ennis silt loam in foreground are well suited to intensive use.
- B, Numerous loose chert fragments interfere with cultivation of corn on Ennis cherty loam.
- C, Field on Greendale cherty loam, undulating phase, containing sufficient loose chert or gravel to interfere with cultivation.

The soil is slightly acid; very permeable to air, roots, and water; free of stone or gravel; and subject to periodic flooding. Compared with other soils of the county, it is moderately high in content of organic matter and plant nutrients and in water-holding capacity.

Profile description:

0 to 12 inches, grayish-brown or light-brown loose fine sandy loam, 6 to 14 inches thick.

12 to 36 inches, light-brown fine sandy loam, 10 to 30 inches thick.

36 inches +, sandy alluvium containing stratified silt and sand in places; 10 or more feet thick.

Included with this soil are areas on very low first bottoms. These areas differ considerably in crop suitability and productivity. They are higher in organic matter and plant nutrients and more productive of the suitable crops, but because they are more subject to flooding, their use is somewhat limited.

Present use and management.—Most of Bruno fine sandy loam is cleared and used chiefly for corn and hay crops. Practically no fertilizer is used, and crops are not systematically rotated. The immediate needs of the farmer usually determine which crop is grown. Under common management, 35 bushels of corn and 1.5 tons of lespedeza hay an acre are expected. A small acreage of peanuts is grown on this soil in the northern part of the county.

Use and management requirements.—Owing to flooding during spring and winter, Bruno fine sandy loam is best suited to the summer annuals. It is well suited to corn, and good yields are obtained year after year. Better returns are obtained, however, if corn is rotated with a legume hay crop such as lespedeza or soybeans. Fertilization is not practiced, but increased yields would be expected from the use of phosphate and nitrogen on less frequently flooded areas. Under good management, including adequate fertilization and the use of high-yielding varieties, 45 bushels of corn and 1.7 tons of lespedeza hay an acre are expected yields.

Bruno loamy fine sand (Bx).—This extremely sandy soil is in long narrow areas on the high natural levees along the Tennessee River. A few acres are covered by the Kentucky Reservoir. The mixed general alluvium from which the soil has formed was washed chiefly from upland soils underlain by sandstone or unconsolidated sand. The soil has developed under a deciduous forest vegetation and is associated with Huntington, Lindside, Melvin, Sequatchie, and Wolftever soils. Surface drainage is moderate, but internal drainage is very rapid.

The soil is strongly acid, low in organic matter and plant nutrients, and very low in water-holding capacity. It is extremely permeable to air, water, and roots. Slopes do not exceed 3 percent.

Profile description:

0 to 26 inches, light-brown or yellowish-brown loose loamy fine sand, 20 to 30 inches thick.

26 inches +, stratified sandy alluvium, 10 feet or more thick.

Present use and management.—Most of Bruno loamy fine sand is cleared and used for crops that are not systematically rotated or fertilized. The principal crops—corn, peanuts, and lespedeza—yield 18 bushels, 500 pounds, and 0.4 ton an acre, respectively, under common management practices.

Use and management requirements.—Bruno loamy fine sand is suited to crop production but naturally low in productivity because of its low water-holding capacity. Its susceptibility to flooding limits use largely to summer annuals. The deficiency of nitrogen, the most needed element in most places, could be corrected by using a short rotation that includes a legume to be turned under. Phosphate and possibly potash are needed for most crops. Moderate applications of fertilizer made at frequent intervals are desirable because soluble fertilizer elements rapidly leach from the soil. Under good management practices expected yields are 25 bushels of corn, 600 pounds of peanuts, and 0.7 ton of lespedeza hay an acre.

Dandridge silt loam, hilly phase (Dc).—Residuum of calcareous shale is the material from which this shallow soil of the uplands developed. It occupies slopes of 15 to 30 percent and differs from the Inman soil mainly in being low in phosphatic material and in having a profile lighter in color and texture. It occurs chiefly on lower ridge slopes along the Buffalo River and Cane, Brush, Short, Hurricane, Rockhouse, and Sinking Creeks. The Needmore, Humphreys, Ennis, and Greendale are closely associated soils. The natural vegetation is deciduous forest.

This soil is strongly to very strongly acid, and compared with the other upland soils, about medium in content of organic matter and plant nutrients. It is permeable to air, roots, and water, but owing to shallow depth, relatively low in water-holding capacity. Internal drainage is moderate, but surface runoff is rapid. Partly weathered shale fragments occur throughout the profile but are more numerous in the lower part. Bedrock outcrops are common, and chert fragments have rolled onto this soil from the higher lying Bodine soils in many places.

Profile description :

- 0 to 10 inches, yellowish-gray to grayish-yellow friable silt loam that contains several small shale fragments; 6 to 12 inches thick.
- 10 to 24 inches ±, brownish-yellow moderately friable silty clay loam spotted with gray and yellow; contains numerous shale fragments; 6 to 18 inches thick; underlain by level-bedded calcareous shale.

Present use and management.—Practically all the hilly phase of Dandridge silt loam is in deciduous forest of oak, beech, and hickory. The forest has been cut over. The present small stand includes many cull trees, is burned over frequently, and is grazed in most areas. Tree growth is fairly rapid.

Use and management requirements.—Dandridge silt loam, hilly phase, is poorly suited to crop production because of strong slopes, high susceptibility to erosion, and low water-holding capacity. It is productive of pasture plants, and on most farms it is best used for pasture. The areas isolated by extensive areas of Fifth-class soils are best used for forest. Good pasture has been established by seeding to a mixture of bluegrass and white clover and carefully controlling grazing until the stand is well established. Application of lime and phosphate will encourage more vigorous growth of pasture plants and bring higher yields of better quality pasture.

Dandridge silt loam, eroded hilly phase (Da).—This shallow moderately eroded soil of the uplands has developed from the re-

siduum of calcareous shale. It differs from the hilly phase in having lost part of the original surface layer, including the thin surface layer of higher organic-matter content, through erosion. It has developed under a deciduous forest vegetation on 15- to 30-percent slopes along the Buffalo River and tributary streams south of Beardstown. It is associated with Bodine, Needmore, Greendale, Ennis, and Humphreys soils.

The soil is strongly to very strongly acid, moderately low in organic matter and plant nutrients, and low in water-holding capacity. Internal drainage is moderate, but surface runoff is rapid. Partly weathered shale fragments are throughout the soil, and some have accumulated on the surface as the finer soil particles were eroded away. Bedrock outcrops are more common than on the uneroded soil. Chert fragments from the higher lying Bodine soils are on the surface in many places.

Profile description :

- 0 to 6 inches, grayish-yellow to light brownish-yellow friable silt loam;
0 to 10 inches thick.
- 6 to 20 inches +, brownish-yellow moderately friable silty clay loam
spotted with gray and yellow; contains numerous shale fragments;
6 to 18 inches thick; underlain by level-bedded calcareous shale.

As a result of the mixing of remnants of the original surface soil with the lower layers during tillage, the present surface layer is highly variable in color and somewhat heavier in texture. Small severely eroded spots are common.

Present use and management.—Most of the eroded hilly phase of Dandridge silt loam is used for pasture. Some areas have a fairly high carrying capacity, but most are poorly managed. Pasture yields are variable, but on the average, moderately high in comparison with those on other upland soils. Fertilization is not a common practice, but a few farmers have applied a small quantity of lime and phosphate in recent years. The small acreage used for crop production returns very low yields.

Use and management requirements.—Dandridge silt loam, eroded hilly phase, is unsuited or very poorly suited to crops requiring tillage but fairly well suited to pasture and semipermanent hay crops. Fair to good pasture is obtained without the use of amendments (pl. 4, *B*), but a higher yield of better quality pasture is expected if lime and phosphate are applied. The most practical means of correcting the nitrogen deficiency is that of including legumes in the pasture mixture. Under proper fertilization and controlled grazing, weeds should not be a serious problem, but clipping may be necessary for some fields.

Dandridge silt loam, severely eroded hilly phase (D_h).—This eroded shallow soil of uplands has developed from the residuum of calcareous shale. It differs from the eroded hilly phase in having lost more of the original surface soil through erosion. It is on 15- to 30-percent slopes and has developed under a deciduous forest vegetation. Areas are largely on lower ridge slopes along the Buffalo River and its tributaries south of Beardstown. The Bodine, Needmore, Greendale, Ennis, and Humphreys are closely associated soils.

The reaction of the soil is strongly to very strongly acid, its organic-matter and plant-nutrient content are low, and its water-holding

capacity is very low. Internal drainage is moderate, but surface runoff is very rapid. Bedrock outcrops are common, and loose chert fragments from the higher lying Bodine soils are on the surface in many places.

Profile description:

0 to 4 inches, grayish-yellow to light brownish-yellow friable silt loam or light silty clay loam, 0 to 8 inches thick.

4 to 18 inches +, brownish-yellow moderately friable silty clay loam spotted with gray and yellow; contains numerous shale fragments; 6 to 18 inches thick; underlain by level-bedded calcareous shale.

The present surface layer consists of remnants of the original surface soil mixed with the upper part of the subsoil. Shallow gullies commonly expose the underlying shale. Removal of the finer soil particles has resulted in a considerable accumulation of small shale fragments in many places.

Present use and management.—All of the severely eroded hilly phase of Dandridge silt loam has been cleared and used for crop or pasture but most of it is now lying idle or is in unimproved pasture that produces very low yields. Little effort has been made to reclaim this soil.

Use and management requirements.—Dandridge silt loam, severely eroded hilly phase, is considered physically unsuitable for crops and very poorly suitable for pasture. On most farms it is best used for forest, even though considerable advance preparation, possibly including fertilization, will be necessary before reforestation can be accomplished. For a discussion of reforestation, see the section on Forests.

Dandridge silt loam, steep phase (D₂).—Steeper slopes (30 to 60 percent but usually less than 45), more variable depth, a larger number of bedrock outcrops, and a greater content of shale differentiate this shallow soil of the uplands from the hilly phase. The soil has developed from the residuum of calcareous shale. Areas occur chiefly on lower ridge slopes along the Buffalo River and tributaries south of Beardstown. The deciduous forest cover consists of oak and hickory.

The soil is strongly to very strongly acid and permeable to air, roots, and water. It is medium in content of organic matter and plant nutrients, compared to other upland soils. Internal drainage is moderate, but surface runoff is very rapid. The water-holding capacity is low. Loose chert fragments from higher lying Bodine soils are on the surface in many places, and bedrock outcrops are common.

Profile description:

0 to 10 inches, yellowish-gray to grayish-yellow friable silt loam containing several small shale fragments; layer 6 to 12 inches thick.

10 to 20 inches +, brownish-yellow friable silt loam or silty clay loam spotted with gray and yellow; contains many shale fragments; 6 to 18 inches thick; underlain by level-bedded calcareous shale.

Present use and management.—Practically all of the steep phase of Dandridge silt loam is in cut-over deciduous forest of oak and hickory. The stand is small and includes many cull trees. The forest is burned over frequently, and most areas are grazed. Tree growth is fairly rapid.

Use and management requirements.—Dandridge silt loam, steep phase, is physically unsuitable for crops or pasture. Forest (see the

section on Forests) is best for most farms. On some farms, the need for pasture land may make it advisable to use this phase for pasture, and under a high level of management, fair to good pasture can be established and maintained. It is important to prevent excessive erosion by maintaining a good sod. This can be accomplished by applying larger quantities of fertilizer and carefully controlling grazing.

Dandridge silt loam, eroded steep phase (D_B).—This shallow upland soil differs from the steep phase in being eroded. It developed from the residuum of calcareous shale under a deciduous forest. Areas are on the lower ridge slopes of 30 to 60 percent along the Buffalo River and its tributaries south of Beardstown. The Bodine, Needmore, Greendale, Humphreys, and Ennis are closely associated soils.

The soil is strongly to very strongly acid, moderately low in organic matter and plant nutrients, and low in water-holding capacity. Internal drainage is moderate, but surface runoff is very rapid. Partly weathered shale fragments are throughout the soil and have accumulated on the surface. Bedrock outcrops are common, and loose chert fragments from the higher lying Bodine soils are on the surface in many places.

Profile description:

0 to 6 inches, grayish-yellow to light brownish-yellow friable silt loam, 0 to 10 inches thick.

6 to 16 inches +, brownish-yellow friable silt loam or silty clay loam spotted with gray and yellow; contains numerous shale fragments; 6 to 18 inches thick; underlain by level-bedded shale.

A considerable part of the original surface soil, including the thin surface layer of higher organic-matter content, has been lost as a result of erosion. The mixing of subsoil material in the plow layer has made the present surface layer variable in color and somewhat heavier in texture than that of uneroded Dandridge silt loam. Some small severely eroded areas are included.

Present use and management.—All of the eroded steep phase of Dandridge silt loam has been cleared and used for crops and pasture, but most areas are now idle or in unimproved pasture. Pasture yields under present management are very low.

Use and management requirements.—Dandridge silt loam, eroded steep phase, is considered unsuitable for crops or pasture in the present agriculture. On most farms it is probably best used for forest. If areas must be used for pasture, the management will be similar to that for the eroded hilly phase, but heavier fertilization and more carefully controlled grazing are necessary.

Dickson silt loam, rolling phase (D_r).—A thin layer of loess, underlain at 24 to 42 inches by cherty limestone residuum, is the material from which this siltpan soil of the uplands has developed. It differs from Sango silt loam in having a stronger slope (5 to 15 percent), somewhat better internal drainage, and a thinner chert-free layer. It occurs as long narrow areas on ridge crests throughout the cherty limestone hills section. Closely associated are the Sango, Mountview, and Bodine soils, and some member of the Bodine series is usually on the ridge slopes below this phase.

The surface soil and subsoil are free of chert, but numerous chert fragments are in the siltpan in many places, and the material below the

siltpan is very cherty. External drainage is moderate, but internal drainage is moderately slow. The upper part of the profile is permeable to air, roots, and water, but the siltpan is only slightly permeable. The soil is low in plant nutrients, organic matter, and water-holding capacity and is strongly to very strongly acid.

Profile description:

0 to 8 inches, yellowish-gray mellow silt loam, 6 to 10 inches thick.

8 to 24 inches, yellowish-brown to brownish-yellow friable silty clay loam; 12 to 20 inches thick.

24 to 38 inches (siltpan), compact silty clay loam mottled with gray, yellow, and brown; 10 to 16 inches thick.

38 inches +, cherty limestone residuum, 10 feet or more thick.

An insignificant acreage is included that differs chiefly in being eroded. In this a considerable part or, in some places, most of the original surface layer is missing.

Present use and management.—Practically all of the rolling phase of Dickson silt loam is in forest of post, blackjack, red, and white oaks. Timber grows slowly and is of poor quality. All areas have been cut over once or more, and most areas are injured by burning and grazing. Some of the cleared areas are used for crops or pasture, but many are idle.

Use and management requirements.—Although it is considered physically suitable for crops, much of Dickson silt loam, rolling phase, is in narrow winding areas on ridge crests and isolated by large areas of Fifth-class soils. It is well suited to a wide variety of crops but its low fertility and low water-holding capacity make it only moderately productive. It is susceptible to erosion if cleared, and crop rotations should be long and consist chiefly of close-growing crops, including legumes. The soil probably can be maintained under a rotation that includes an intertilled crop once every 5 or 6 years.

The soil is deficient in lime and most plant nutrients, and applications of lime and phosphate are necessary to establish and maintain legume crops. All crops will respond to phosphate and potash fertilizer, and all except legume crops respond to nitrogen. Special measures for controlling runoff may be desirable. The row crop should always be planted and tilled on the contour if at all feasible. Terraces may be practical on the long smooth slopes, although they have proved successful only when used as part of a good management program. Under good management, yields of 30 bushels of corn, 380 pounds of cotton, and 1.2 tons of lespedeza hay an acre are expected.

Dunning silty clay loam (Dg).—This soil of the stream bottoms consists of recent alluvium washed from upland soils underlain by clayey limestone. The soil is on nearly level stream bottoms and has formed under a deciduous forest vegetation that includes a high proportion of water-tolerant trees. It occurs along the creeks in the southwestern part of the county, and in most places it is adjacent to large areas of stony land.

Reaction is neutral to slightly acid. Content of organic matter and plant nutrients is moderately high. Internal drainage is slow to very slow; surface runoff, very slow. The water-holding capacity is high, but the quantity of moisture available for growing plants is moderately low. The soil is relatively free of stones or gravel.

Profile description:

0 to 5 inches, dark grayish-brown or almost black moderately plastic silty clay loam, 0 to 8 inches thick.

5 to 16 inches, dark grayish-brown strongly plastic silty clay spotted with bluish gray in the lower part; 8 to 16 inches thick.

16 inches +, bluish-gray strongly plastic silty clay spotted with yellow and brown; 1 to 5 feet thick.

Present use and management.—About half of Dunning silty clay loam is in forest of water-tolerant oaks. Much of the rest is used for corn, although a small percentage is in other crops and pasture. Crop yields vary greatly, mostly according to the season, but are generally moderately low.

Use and management requirements.—Dunning silty clay loam is poorly suited to crops. Use suitability is limited by imperfect internal drainage and susceptibility to flooding. The soil is fairly well suited to corn and well suited to some hay and forage crops. Artificial drainage might broaden use suitability, but it would not lessen susceptibility to flooding.

The soil can be used almost continuously for growing the crops to which it is adapted, and if moisture conditions are favorable, good yields may be expected without fertilization. On many farms pasture is the best use for this soil. Weeds are difficult to control in pastures and it is advisable to remove excess herbage and control weed growth by clipping frequently. Under good management, 25 bushels of corn, 1 ton of lespedeza hay, and 1.4 tons of soybean hay an acre are average yields expected.

Egam silty clay loam (EA).—This first-bottom soil has developed on nearly level flood plains under a deciduous forest of oak, hickory, elm, beech, and sycamore. The parent material consists of mixed alluvium washed chiefly from upland soils underlain by limestone. The material was deposited chiefly on high first bottoms (pl. 4, C) or in slack water on the low first bottoms. Like the Huntington soil, this one is on the Tennessee River flood plain. Some areas are covered by the Kentucky Reservoir, but most of them are farther back from the river. The soil is darker colored, heavier textured, and less productive than the Huntington soil. It is closely associated with Huntington, Lindside, Melvin, Bruno, and Wolftever soils.

The quantity of organic matter is moderate, and that of plant nutrients relatively high. Reaction is medium acid. External drainage is slow, and internal drainage, moderately slow. The water-holding capacity is high, but the quantity available for crop growth is low.

Profile description:

0 to 12 inches, dark grayish-brown or almost black moderately plastic silty clay loam, 8 to 16 inches thick.

12 to 26 inches, dark grayish-brown to yellowish-brown compact silty clay loam, 10 to 20 inches thick.

26 inches +, grayish-brown moderately friable silty clay loam spotted with light gray; 10 feet or more thick.

Present use and management.—Practically all of Egam silty clay loam is cleared and used for crops. Corn is the most widely grown crop, but the proportion of the soil in corn is not so high as for the Huntington soil. An appreciable acreage is in lespedeza, cowpeas, soybeans, and oats, and possibly 15 or 20 percent is idle. Fertilizer is not used, nor are crops systematically rotated. Crop yields vary

according to the quantity and distribution of rainfall. About 25 bushels of corn and 1.3 tons of lespedeza hay are average yields under ordinary management.

Use and management requirements.—Egam silty clay loam is suitable for crop production, but periodic overflows and extreme droughtiness make it limited in use suitability. The management program should include selection of drought-resistant crops and improved seedbed preparation and tillage practices. Corn, the most commonly grown crop, is more susceptible to damage from droughts than many of the less frequently grown crops. Cane crops, grown for seed or fodder, are more drought resistant, and their acreage yield of feed is higher. Lespedeza, soybeans, and cowpeas usually give high yields, and complete failures are rare. Crops such as small grains that mature before the dry summer and fall seasons usually yield well, but their production is discouraged by the danger of overflow. Spring oats, rarely lost as a result of flooding, are grown for seed or hay on many farms.

The seedbed is often not well enough prepared, and tillage practices are frequently poorly timed and inadequate. The soil can be tilled over a narrow range of moisture conditions. It tends to puddle when plowed too wet and on drying becomes hard and cloddy. If allowed to become too dry, it breaks up into clods. A well-prepared seedbed will promote better germination of seed and better early growth of crops. The use of a rotation that includes a legume and the plowing under of green-manure crops would improve tilth as well as productivity.

Although 60 or 70 bushels an acre of corn are obtained in favorable seasons, the average yield under good management is about 35 bushels. Under similar management, 1.5 tons of lespedeza hay and 2 tons of soybean hay an acre are expected.

Emory silt loam (Eb).—This colluvial soil is formed on toe slopes, on small gently sloping alluvial fans, and along narrow drainageways. Its material washed from adjacent slopes where there are upland soils underlain by noncherty limestone. It developed under a deciduous forest on 2- to 5-percent slopes. Areas are chiefly in the southwestern part of the county in the Talbott-stony land-Lindside soil association, where they are closely associated with Talbott, Maury, Etowah, Lindside, and Melvin soils. Some of the soil is flooded by the Kentucky Reservoir.

The soil is medium acid, high or moderately high in content of organic matter and plant nutrients, and permeable to air, roots, and water. Both external and internal drainage are moderate, and the water-holding capacity is high. In most places the profile is free of stones or chert, but in a few some chert fragments are on the surface and throughout the profile. The depth to bedrock, though variable, is generally more than 3 feet. Bedrock outcrops are not common.

Profile description:

0 to 10 inches, brown friable silt loam, 6 to 18 inches thick.

10 to 30 inches, brown, light-brown, or reddish-brown friable silt loam, or silty clay loam, 10 to 30 inches thick.

30 inches +, yellowish-brown to reddish-brown friable silt loam or silty clay loam splotted with gray; 0 to 5 feet or more thick.

Some areas in which the colluvium includes an admixture of cherty limestone material have grayish-brown surface soil and are lighter in texture throughout the profile. Also included are areas consisting of recent colluvium washed from severely eroded upland soils, others of soils formed from colluvium washed from stony land having heavy textures and a dark grayish-brown color, and yet others of soils from colluvium washed from Maury soils that are similar to but much more fertile than the Emory soil. These variations are similar to Emory silt loam in use and management requirements but are less productive in most places.

Present use and management.—Nearly all of Emory silt loam is cleared and used for crops. About 50 percent is in corn, 20 percent hay, 20 percent in miscellaneous crops and pasture, and 10 percent in woods or idle open land. Although fertilizers are not commonly used, yields are relatively high. Corn yields 40 bushels; cotton, 360 pounds; and lespedeza, 1.6 tons an acre.

Use and management requirements.—Emory silt loam is physically well suited to crop production. It is easily tilled, and owing to its excellent moisture conditions and high fertility, it is one of the most productive soils in the county. It is suited to intensive use, but productivity could be increased by short rotations that include a legume and by adequate and proper fertilization. Alfalfa and red clover can be grown successfully if lime and phosphate are added. All crops respond to phosphate in most places, although good yields are obtained without the use of fertilizer. Under good management, corn, cotton, and lespedeza hay yield 55 bushels, 520 pounds, and 2 tons an acre, respectively.

Ennis silt loam (Eb).—Occupying first bottom lands, this soil is similar to the Huntington soil in drainage and many profile characteristics, but it is formed from a less general type of alluvium. The alluvium has washed almost entirely from upland soils underlain by cherty limestone, although loess is included in most places. The soil has developed on nearly level flood plains under a deciduous forest vegetation and occupies areas along creeks in all parts of the cherty limestone hills section. It is closely associated with Humphreys soils of the terrace lands (pl. 5, A), Greendale soils of the colluvial lands, and Bodine soils of the uplands. It occurs in long narrow strips with Greendale and Humphreys soils in most places, and part of it is permanently flooded.

This soil is medium to strongly acid, moderately high in organic matter and plant nutrients, and high in water-holding capacity. It is readily permeable to air, roots and water. External drainage is slow, but internal drainage is moderate. Some water-worn chert is on the surface and throughout the profile in most places, but not enough to interfere materially with cultivation. The quantity of chert in the lower layers is highly variable; loose beds of chert at shallow depths lower the water-holding capacity in a few places.

Profile description:

0 to 12 inches, grayish-brown to light-brown friable silt loam, 6 to 18 inches thick.

12 to 24 inches, light-brown friable silt loam, 8 to 20 inches thick.

24 inches +, light-brown or grayish-brown friable silt loam or cherty silt loam spotted with gray; more cherty with depth; stratified alluvium at 3 to 5 feet.

Present use and management.—Nearly all of Ennis silt loam is cleared and used for crops or pasture; 70 percent is in corn, 5 percent in peanuts, and the rest chiefly in hay and forage crops. Fertilizer is not commonly used, and the soil kept in row crops almost continuously. Under ordinary management practices, about 35 bushels of corn, 800 pounds of peanuts, and 1.4 tons of lespedeza hay are obtained.

Use and management requirements.—Ennis silt loam is somewhat limited in use suitability because of its susceptibility to flooding. It has good tilth properties and can be tilled over a wide range of moisture content, but it is susceptible to scouring or to deposition of sandy or gravelly material by floodwaters. Ordinarily, however, flooding benefits the soil by adding sediments high in plant nutrients. The soil is well suited to peanuts, but the quality and yield of all crops except corn are not so good as on the adjacent Humphreys soils.

Productivity can be increased considerably by adequate fertilization, application of some lime, and the use of a suitable rotation. As the soil has favorable physical characteristics, response to fertilizer is good. Phosphate and nitrogen are needed, and potash is likely necessary, especially for legumes. The rotation should include corn and legumes or legume-grass mixtures, the legumes to be cut for hay or turned under. In many areas the danger of flooding makes it inadvisable to grow winter grains. Corn yields well year after year if liberal applications of fertilizer, especially phosphate and nitrogen, are used. Many farmers grow alternate rows of corn and soybeans or grow soybeans in the corn. This is a good practice, particularly where the crop is to be hogged off.

About 50 bushels of corn, 1,000 pounds of peanuts, and 1.6 tons of lespedeza hay an acre are expected under good management.

Ennis cherty loam (Ec).—Alluvium washed chiefly from uplands underlain by cherty limestone is the material from which this soil of the first bottoms developed. It differs from Ennis silt loam in having more chert on the surface and throughout the profile. Water-worn chert fragments are numerous enough to interfere with cultivation (pl. 5, B). Areas are along streams in all parts of the cherty limestone hills section in close association with Humphreys, Greendale, and Bodine soils.

The soil is medium to strongly acid and medium in content of organic matter and plant nutrients. It is permeable to air, roots, and water. External drainage is moderate, but internal drainage is rapid to very rapid. The water-holding capacity is variable but usually low.

Profile description:

- 0 to 12 inches, grayish-brown or light-brown friable cherty loam, 6 to 18 inches thick.
- 12 to 24 inches, light-brown cherty loam splotted with gray in lower part, 8 to 20 inches thick.
- 24 inches +, very cherty alluvium containing stratified beds of chert and silt in places; 2 to 10 feet thick.

Present use and management.—Most of Ennis cherty loam is cleared and used for crops, chiefly corn. It is used to a greater extent for pasture than Ennis silt loam, and crop yields are much lower. Average yields under ordinary management are 18 bushels of corn, 600 pounds of peanuts, and 0.8 ton of lespedeza hay an acre.

Use and management requirements.—Although the use suitability of Ennis cherty loam is limited by periodic flooding, it is suited to many of the common crops, including corn, peanuts, hay, and most forage crops. It is difficult to till because of chertiness, and low yields are attributed to the low water-holding capacity. The use and management requirements are similar to those for Ennis silt loam, but response to good management is not so great. Acre yields expected under good management practices are 25 bushels of corn, 700 pounds of peanuts, and 1.4 tons of lespedeza hay.

Etowah gravelly silt loam, hilly phase (E_f).—The alluvium from which this soil of the high terrace lands has developed is mixed, but it washed chiefly from upland soils underlain by limestone. The soil has developed on 15- to 30-percent slopes under a deciduous forest vegetation. Areas are on old high terraces of the Tennessee River, chiefly in the southern part of the county, where they are associated with Pickwick, Paden, and other Etowah soils.

The subsoil and surface layers are gravelly. The soil is permeable to air, roots, and water but low in water-holding capacity. It is medium to strongly acid. The content of organic matter and plant nutrients is moderately high. Both internal and external drainage are rapid to very rapid.

Profile description:

0 to 8 inches, grayish-brown loose gravelly silt loam, 6 to 12 inches thick.

8 to 30 inches, reddish-brown or brownish-red friable gravelly silty clay loam, 20 to 30 inches thick.

30 inches +, reddish-brown to brownish-red friable gravelly silty clay loam that grades into loose beds of gravel; 5 to 20 feet or more thick.

Soils included with this phase vary considerably in many characteristics. A small acreage is moderately eroded; small areas of relatively chert-free Pickwick soils are included.

Present use and management.—Practically all of the hilly phase of Etowah gravelly silt loam is wooded with red and white oaks and hickory. All areas have been cut over a number of times, and the present stand is young. Timber grows at a moderately fast rate.

Use and management requirements.—Etowah gravelly silt loam, hilly phase, is not considered suitable for crop production, because of its steep slopes, high gravel content, and low water-holding capacity. It is poorly suited to pasture, but fair pasture can be established and maintained by applying lime and phosphate, by top dressing yearly with moderate applications of phosphate, and by including one or more legumes in the pasture mixture. Grazing should be carefully controlled to maintain a good sod at all times. The carrying capacity of the pasture will probably be low except in seasons of high rainfall. Susceptibility to injury from erosion is high, and a good management program is necessary to prevent excessive loss of soil material.

Etowah gravelly silt loam, severely eroded hilly phase (E_g).—The old mixed alluvium from which this gravelly soil of the terrace lands is formed has washed chiefly from upland soils underlain by limestone. The soil is on old high terraces of the Tennessee River, chiefly in the southern part of the county. It occupies ridge slopes of 15 to 30 percent, although a few included areas have slopes exceeding 30 percent.

Most of the original surface soil—silt and other fine separates—and a part of the subsoil have eroded away and left an accumulation of gravel on the surface. Although sheet erosion has been severe, gully-ing is not common. The profile contains gravel throughout and the quantity increases with depth in most places. Gravel in the surface layer is sufficient to interfere with cultivation, if cultivation were otherwise feasible. The soil is medium to strongly acid, low to very low in organic matter and plant nutrients, readily permeable, and very low in water-holding capacity. Both internal and external drainage are rapid to very rapid.

Profile description:

- 0 to 4 inches, light-brown or reddish-brown friable gravelly silt loam, 0 to 6 inches thick.
- 4 to 26 inches, reddish-brown or brownish-red gravelly silty clay loam, 20 to 30 inches thick.
- 26 inches +, brownish-red friable gravelly silty clay loam that grades into beds of gravel; 5 to 20 feet thick.

Present use and management.—All of the severely eroded hilly phase of Etowah gravelly silt loam has been cleared and used for crops and pasture, but poor use and management have caused severe erosion. Most of the soil is now idle or wasteland.

Use and management requirements.—Etowah gravelly silt loam, severely eroded hilly phase, is not suitable for crops or pasture, because of its strong slopes, high content of gravel, low fertility, and low water-holding capacity. Although the soil is poorly suited to forest and difficult to reforest, it is probably best suited to that use. For a detailed discussion of reforestation see the section on Forests.

Etowah gravelly silt loam, eroded rolling phase (Ee).—This soil of the terrace lands differs from the hilly phase in being eroded and in having milder slopes (5 to 15 percent). The parent material—old mixed alluvium—has washed chiefly from upland soils underlain by limestone. The soil occurs on ridge crests of the old, high Tennessee River terraces, chiefly in the southern part of the county. It is associated with Paden, Pickwick, Emory, Lindside, Melvin, and other Etowah soils.

A substantial part of the original surface layer has been eroded away. The present surface layer is decidedly more gravelly than was the uneroded one, for the finer separates have been removed, and as a result gravel has accumulated on the surface. The quantity of gravel in the plow layer is sufficient to interfere with cultivation. The soil is medium to strongly acid, low in organic matter, very permeable to air, roots, and water, and very low in water-holding capacity. Internal drainage is rapid to very rapid; external drainage is moderate. Most of this soil is moderately eroded, but small severely eroded and uneroded areas are included.

Profile description:

- 0 to 6 inches, light-brown or grayish-brown loose gravelly silt loam, 0 to 8 inches thick.
- 6 to 28 inches, reddish-brown or brownish-red friable gravelly silty clay loam, 20 to 30 inches thick.
- 28 inches +, brownish-red friable gravelly silty clay loam grading into loose beds of gravel; 5 to 20 feet or more thick.

Present use and management.—All of the eroded rolling phase of Etowah gravelly silt loam is cleared and has been used for crops and

pasture, but most of it is now wasteland or unimproved pasture. Yields are very low on the small acreage used for crops, and soil improvement or maintenance is not being attempted in many places.

Use and management requirements.—Etowah gravelly silt loam, eroded rolling phase, is considered suitable for crops requiring tillage, but owing to low water-holding capacity and low fertility, it is not a productive soil for most of them. It is probably best suited to semi-permanent hay crops or pasture. Fair pasture can be established and maintained, but it will require liberal applications of lime and phosphate and carefully controlled grazing. Pasture yields will probably be low except during rainy seasons because of the low water-holding capacity.

Greendale cherty loam, undulating phase (Gb).—This soil formed from local alluvium or colluvium at the foot of upland slopes. The parent material washed from upland soils underlain by cherty limestone. The soil has developed on 2- to 5-percent slopes under a deciduous forest of white and red oaks and hickory. It occupies gently sloping alluvial-colluvial fans formed by small streams emerging onto the flood plains of larger streams, narrow bottoms along deeply entrenched stream beds, or narrow sloping areas at the foot of steep slopes (pl. 6). The small areas are widely distributed throughout the cherty limestone hills section in close association with Bodine, Pace, Humphreys, Ennis, and Dickson soils. Some areas are covered by the Kentucky Reservoir.

The soil is medium to strongly acid. Organic-matter content, though moderately low, is higher than that of adjacent upland soils. The soil profile is very porous, extremely permeable to air, roots, and water, and low in water-holding capacity. External drainage is moderate, and internal drainage is rapid to very rapid. All parts of the profile contain many chert fragments $\frac{1}{2}$ to 4 inches in diameter. The surface layer has enough chert to interfere with cultivation (pl. 5, C), although a small acreage is included that is relatively chert-free in the plow layer.

Profile description:

- 0 to 10 inches, grayish-brown or brownish-gray friable cherty loam, 6 to 14 inches thick.
- 10 to 20 inches, light-brown or yellowish-brown friable cherty loam to light cherty silty clay loam, 8 to 16 inches thick.
- 20 inches +, brownish-yellow very cherty loam spotted with gray; 0 to 10 feet thick.

Present use and management.—About 20 percent of the undulating phase of Greendale cherty loam is in forest, 55 percent in corn, 5 percent in peanuts, 10 percent in miscellaneous crops, and 10 percent in gardens and farmsteads. Many of the houses and most of the gardens in the cherty limestone hills section are on this soil. Fertilizers are seldom used except on farm gardens, and though many crops are grown, they are not systematically rotated. Under ordinary management, about 25 bushels of corn, 700 pounds of peanuts, and 1.1 tons of lespedeza hay are obtained.

Use and management requirements.—Greendale cherty loam, undulating phase, is well suited to intensive use for crops, but the chert interferes with cultivation (pl. 7, A). Owing to extremely good drainage and aeration, the soil is well suited to early vegetable crops.

Field crops, especially corn, are highly susceptible to injury from droughts. Drought-resistant or early maturing crops are therefore better suited.

Productivity can undoubtedly be increased by using improved management practices. The soil is highly responsive to fertilization and liming; yields are fair if these are not applied. Phosphate and possibly potash are needed for all crops. The legume crop will need liming, and all except the legume crop and the crop immediately following will need nitrogen. A short rotation that includes a legume should increase crop yields, as would applications of barnyard manure or the turning under of green-manure crops. The soil is similar to Humphreys cherty loam in use and management requirements. Under good management, about 35 bushels of corn, 800 pounds of peanuts, and 1.3 tons of lespedeza hay an acre are expected.

Greendale cherty loam, rolling phase (GA).—Slopes of 5 to 15 percent and a colluvial deposit less deep are the points of difference between this soil and the undulating phase. The parent material has washed from adjacent upland slopes occupied by soils underlain by cherty limestone. The soil is widely distributed in areas averaging less than 4 acres throughout the cherty limestone hills section. It is associated with Bodine, Dickson, Pace, Humphreys, and Ennis soils.

The soil is medium to strongly acid, moderate to low in content of organic matter and plant nutrients, low in water-holding capacity, and extremely permeable to air, plants, and water. External drainage is moderate; internal drainage is rapid to very rapid. All layers contain chert, there being enough in the surface layer to interfere with cultivation.

Profile description:

0 to 10 inches, grayish-brown to brownish-gray friable cherty loam, 6 to 14 inches thick.

10 to 20 inches, light-brown or yellowish-brown friable cherty loam or light silty clay loam, 8 to 16 inches thick.

20 inches +, brownish-yellow very cherty loam splotched with gray; 0 to 10 feet thick.

Present use and management.—The rolling phase of Greendale cherty loam is used and managed much like the undulating phase, except a larger part is wooded. Crop yields are somewhat lower and more variable. In many places areas are not cleared unless they are part of a larger field of crop-adapted soils.

Use and management requirements.—Because of the stronger slopes and the smaller individual areas, Greendale cherty loam, rolling phase, is inferior to the undulating phase for crop production. The cleared areas are moderately susceptible to erosion, and in many places the removal of the finer soil particles by erosion has resulted in an accumulation of chert fragments on the surface.

Humphreys silt loam (Ho).—Medium-sized areas of this well-drained soil occupy low terraces along the Buffalo River and the major creeks in the cherty limestone hills section. The alluvium from which the soil has developed washed mainly from upland soils underlain by cherty limestone but it may contain a small admixture of loess or high grade limestone material. The relief is nearly level to gently sloping

(1 to 5 percent). The soil has developed under a deciduous forest of red and white oaks and hickory. It is closely associated with Ennis, Greendale, Pace, Bodine, and Dickson soils. The Kentucky Reservoir covers some areas.

The soil is strongly to medium acid, medium to high in content of organic matter and plant nutrients, very permeable to air, roots, and water, and high in water-holding capacity. External drainage is moderately slow, and internal drainage is moderate. Some small water-worn chert is in the surface layer in most places but does not interfere seriously with tillage. The lower horizons vary considerably in content of chert, in many places being very cherty.

Profile description:

0 to 8 inches, grayish-brown or light-brown mellow silt loam, 6 to 10 inches thick.

8 to 30 inches, light-brown to yellowish-brown friable light silty clay loam, 16 to 24 inches thick.

30 inches +, brownish-yellow heavy silt loam or cherty silt loam splotted with gray; 2 to 10 feet thick.

Present use and management.—Nearly all of Humphreys silt loam is cleared and is being used intensively for crop production. Corn, peanuts, and lespedeza, the major crops, yield 30 bushels, 900 pounds, and 1.2 tons, respectively, under ordinary management practices. About 30 percent of the soil is used for corn, 30 percent for lespedeza, 5 percent for peanuts, 20 percent for miscellaneous crops, and 15 percent is in woods or lying idle. Fertilizers and systematic crop rotations are seldom used.

Use and management requirements.—Humphreys silt loam is a moderately fertile soil productive of most of the crops common to the area. It occurs in an area having a small percentage of crop-adapted soils and therefore must be cropped almost continuously on most farms. The soil has good tilth properties, can be tilled over a wide range of moisture conditions, has a high water-holding capacity, and is not very susceptible to erosion; consequently, it is well suited to intensive use.

Crop yields can be maintained or increased by adequate and proper fertilization. Although the soil produces well without amendments, it is highly responsive to them, and greatly increased yields may be expected if fertilizer and lime are applied. A systematic rotation that includes a legume should be followed if feasible. A short rotation may be used as long as a legume is included. A legume cover crop following the intertilled crop and turned under as green manure will aid in maintaining the supply of organic matter and nitrogen. Lime and phosphate are needed for legumes, and phosphate is needed for maximum yields of all crops. If legumes are not included in the rotation, nitrogen is needed. Under good management, 45 bushels of corn, 1,200 pounds of peanuts, and 1.6 tons of lespedeza hay are average yields.

Humphreys silt loam, eroded phase (H_o).—This well-drained soil of the low stream terraces lies along the Buffalo River and the larger streams. It has formed from alluvium washed chiefly from soils underlain by cherty limestone. It differs from Humphreys silt loam in being moderately eroded, and though its slope range (1 to 5 percent) is the same, its average slope is greater. It is closely asso-

ciated with Ennis, Greendale, Pace, and Bodine soils. Part of it is covered by the Kentucky Reservoir.

The soil is strongly acid, low in organic matter, moderately low in plant nutrients, and high in water-holding capacity. It is very permeable to air, roots, and water. Surface runoff is moderately slow; internal drainage is moderate. Some small water-worn chert fragments occur throughout the soil in most places but they do not interfere seriously with tillage. The lower layers vary considerably in content of chert and in many places are very cherty.

Profile description:

0 to 6 inches, grayish-brown, light-brown, or yellowish-brown friable silt loam, 0 to 8 inches thick.

6 to 28 inches, light-brown to yellowish-brown friable light silty clay loam; may range from 16 to 24 inches in thickness.

28 inches +, brownish-yellow heavy silt loam or cherty silt loam splotted with gray; 2 to 10 feet thick.

A substantial part of the original surface soil has been lost through erosion. The present surface layer consists of remnants of the original surface soil mixed with the upper part of the subsoil. This mixing has made the present surface layer highly variable in color and somewhat heavier in texture than the original layer.

Present use and management.—All of the eroded phase of Humphreys silt loam has been cleared and used for crops or pasture. At present 25 percent is in corn, 35 percent in lespedeza, 5 percent in peanuts, 20 percent in miscellaneous crops, and 15 percent is idle. Although several crops are grown, they are not systematically rotated or fertilized. Under ordinary management practices, 20 bushels of corn, 800 pounds of peanuts, and 1 ton of lespedeza hay are average acre yields.

Use and management requirements.—The loss of soil material through erosion and the depletion of fertility through continuous cropping and erosion have greatly lowered the productivity of Humphreys silt loam, eroded phase. In its present condition it is decidedly inferior to Humphreys silt loam for crop production, but it is very responsive to good management, including crop rotation and fertilizer. The rotation can be short but it should include a legume, preferably a deep-rooted one. The fertilizer requirements are similar to those for Humphreys silt loam. Mechanical means of erosion control should not be necessary if proper crop rotation and fertilization are followed.

Humphreys cherty loam (H_A).—The alluvium from which this well-drained cherty soil of the terrace lands developed has washed from upland soils underlain chiefly by cherty limestone. The soil developed on 1- to 5-percent slopes under a deciduous forest vegetation. It is widely distributed throughout the county—chiefly on low terraces along the small streams—in association with Ennis, Greendale, Pace, and Bodine soils.

The soil is strongly to very strongly acid, medium in content of organic matter and plant nutrients, moderately low in water-holding capacity, and extremely permeable to air, roots, and water. External drainage is moderate, and internal drainage is rapid. The plow layer contains chert in quantity sufficient to interfere with cultivation. The ½- to 6-inch chert fragments constitute 25 to 50 percent of the soil mass in most places.



Greendale cherty loam, undulating phase, on (A) gently sloping alluvial-colluvial fans and (B) along intermittent streams.



- A, Pasture on Greendale cherty loam, undulating phase, that contains sufficient chert to interfere with cultivation of crops.
B, Soybean hay on Inman silty clay loam, eroded hilly phase.
C, Maury silty clay loam, eroded rolling phase, on low terracelike ridge slopes in the limestone valleys; Inman soil on the steeper slopes; and Talbott soils on the forested land in background.

Profile description :

- 0 to 8 inches, grayish-brown or light-brown friable cherty loam, 6 to 10 inches thick.
- 8 to 30 inches, light-brown to yellowish-brown friable cherty clay loam, 16 to 24 inches thick.
- 30 inches +, brownish-yellow very cherty loam splotted with gray; 2 to 10 feet thick.

Many bottomlike areas are included; the material in these would be more accurately called local alluvium, as it washed largely from the adjacent slopes. Unlike the cherty loam along the larger streams, these included areas are not susceptible to flooding.

Present use and management.—Most of Humphreys cherty loam is cleared for crops or pasture. Yields of the principal crops, lower than those on Humphreys silt loam, are 18 bushels of corn, 700 pounds of peanuts, and 0.7 ton of lespedeza hay an acre. The soil is kept in row crops almost continuously; occasionally a crop of lespedeza hay is grown. Some lime and phosphate have been used in recent years, but adequate fertilization is not a common practice.

Use and management requirements.—Humphreys cherty loam is suited to crop production, but the chert fragments in the plow layer interfere with cultivation. The moderate fertility and low water-holding capacity of the soil result in low crop yields. The use and management requirements are similar to those for Humphreys silt loam, but the response is not so good. Yields of about 25 bushels of corn, 900 pounds of peanuts, and 1 ton of lespedeza hay an acre are obtainable under good management.

Humphreys cherty loam, eroded phase (H_B).—This soil of the low stream terraces differs from the Humphreys cherty loam in being moderately eroded. The alluvium from which it is derived has washed chiefly from upland soils underlain by cherty limestone. The slope range is 1 to 5 percent. This widely distributed soil is associated with Ennis, Greendale, Pace, and Bodine soils.

The soil is strongly to very strongly acid, moderately low in organic matter and plant nutrients, and extremely permeable to air, roots, and water. External drainage is moderate, and internal drainage is rapid. The water-holding capacity is low. There is enough chert in the plow layer to interfere with cultivation.

Profile description :

- 0 to 6 inches, grayish-brown to brownish-yellow friable cherty loam, 0 to 8 inches thick.
- 6 to 28 inches, light-brown to yellowish-brown friable cherty clay loam, 16 to 24 inches thick.
- 28 inches +, brownish-yellow very cherty loam splotted with gray; 2 to 10 feet thick.

Erosion has caused the loss of a considerable part of the original surface soil, and as a result chert has accumulated on the surface and in the plow layer. Subsoil and surface soil materials have mixed in the plow layer and influenced its color and texture.

Present use and management.—All of the eroded phase of Humphreys cherty loam is cleared and has been used for crops and pasture. The use and management practices are similar to those on the cherty loam, although a larger part of the land is idle. Corn, peanuts, and lespedeza are the principal crops grown, and without

systematic rotation or fertilization, average yields are about 14 bushels, 500 pounds, and 0.6 ton an acre, respectively.

Use and management requirements.—Humphreys cherty loam, eroded phase, is inferior to the uneroded cherty loam for crop production. It is lower in fertility; consequently, applications of fertilizer should be heavier and a rotation that includes a legume is more important. Mechanical means of erosion control should not be necessary, but tillage should be on the contour if feasible. Intertilled crops should be followed by a cover crop.

Huntington silt loam (H₂).—This first-bottom soil has formed from mixed recent alluvium washed chiefly from upland soils underlain by limestone. It is on nearly level flood plains under a deciduous forest of red and white oaks, hickory, elm, beech, maple, ash, and sycamore. It occupies long narrow strips on the first bottoms along the Tennessee River, where it is closely associated with Egam, Bruno, Lindside, Melvin, Wolftever, and Sequatchie soils. Some of the acreage is covered by the Kentucky Reservoir.

Organic-matter and plant-nutrient contents and water-holding capacity are high, and permeability to air, roots, and water is moderate. External drainage is moderately slow, but internal drainage is moderate. The soil is slightly acid to neutral throughout the profile.

Profile description:

0 to 12 inches, brown or light-brown friable silt loam or heavy silt loam, 6 to 18 inches thick.

12 to 30 inches, light-brown friable heavy silt loam or silty clay loam, 10 to 30 inches thick.

30 inches +, light-brown friable silt loam splotted with gray and containing an appreciable quantity of sand in many places; 2 to 20 feet thick.

Present use and management.—Practically all of Huntington silt loam is cleared and used for crops. About 80 to 90 percent of the cleared land is used for corn, and most of the rest is in lespedeza. Very little land is ever idle. Corn is grown year after year on most areas without fertilization or crop rotation. Fertilizers are rarely if ever used. About 45 bushels of corn and 1.8 tons of lespedeza hay are average acre yields under ordinary management.

Use and management requirements.—Huntington silt loam is the most fertile and most productive soil in the county for the crops to which it is suited. Its high natural fertility and durability have made possible production of large crop yields year after year, and its fertility is augmented almost yearly by the sediment deposited by floodwater. Owing to susceptibility to flooding and high fertility, the use suitability is somewhat restricted. Many hay and forage crops are suited and are grown in rotation with corn on the less productive areas. Since the soil is suited to almost continuous corn production without fertilization, improved management practices are concerned chiefly with improved seedbed preparation and tillage practices and with the selection of higher yielding seed varieties or hybrids. About 55 bushels of corn, 1.9 tons of lespedeza hay, and 2.2 tons of soybean hay an acre are average expectable yields under good management.

Inman silty clay loam, eroded hilly phase (I_A).—This shallow soil of the uplands developed from the residuum of interbedded

phosphatic limestone and shale. It occupies 15- to 30-percent slopes and has developed under a deciduous forest that included some cedar. Small areas occur in the southwestern part of the county in association with Maury, Emory, Lindsides, and Talbott soils. It is on the lower ridge slopes in the Talbott-stony land-Lindsides soil association.

The soil is medium to strongly acid, low in organic matter, and moderate in content of plant nutrients. It is comparatively high in phosphorus but low in many of the other essential elements. External drainage is rapid to very rapid, and internal drainage is moderately slow. The water-holding capacity is low. Numerous shale fragments are on the surface and throughout the profile in most places.

Profile description:

- 0 to 5 inches, grayish-brown to brownish-yellow moderately friable silty clay loam, 0 to 8 inches thick.
- 5 to 16 inches, yellowish-brown or brownish-yellow strongly plastic silty clay to moderately friable silty clay loam mottled with gray and yellow; contains numerous shale fragments, especially in the lower part.
- 16 inches +, alternate layers of phosphatic limestone and shale.

Much of the original surface layer has been lost through erosion, and the mixing of the upper part of the subsoil with the remnants of the surface soil in the plow layer has resulted in a heavier texture and considerable variation in color. The removal of the finer particles has also resulted in an accumulation of shale fragments on the surface in most places. The soil varies considerably in depth to bedrock and in content of shale. Many included soils are transitional between the Inman and Maury soils. Over about half of these areas most of the surface layer and part of the subsoil have been lost. Shallow gullies are common. Some areas are on ridge crests of 5- to 15-percent slope. These variations do not change greatly the use and management, but the deeper soils are more productive.

Present use and management.—Most of the eroded hilly phase of Inman silty clay loam is idle or in wasteland, but a small part is used for crops and pasture. The soil is on short slopes, and fields are very small. Management is like that for the associated Maury soil in most places. Crop yields are very low, but pasture yields are fair to good.

Use and management requirements.—Extreme susceptibility to erosion and the low water-holding capacity of Inman silty clay loam, eroded hilly phase, make it very poorly suited to intertilled crops. Nevertheless, it is fairly well suited to pasture and hay crops (pl. 7, B). Compared with most other soils in the county, it is fairly high in content of phosphorus but low in nitrogen and moderately low in lime.

Lime is necessary in some places to obtain a pasture of high carrying capacity and a sod that will control accelerated erosion. Nitrogen may be needed to establish the pasture, but if legumes are included they should supply needed nitrogen after the pasture is established. Response to phosphate is fair to good on cropped areas in some places. Mechanical means of erosion control are not practical in many places because of the short moderately steep slopes, but diversion ditches or terraces can be used to divert the water from the higher slopes and thus aid in controlling erosion. If grazing is properly controlled, a sod that will control erosion should be fairly easy to maintain.

Lindside silt loam (La).—The nearly level or slightly depressional areas of this soil have formed on the first bottom lands under a cover of water-tolerant trees. The soil consist of mixed recent alluvium washed chiefly from upland soils underlain by limestone. In most places it is gravel-free. In drainage and associated characteristics it is intermediate between the well-drained Huntington soil and the poorly drained Melvin. Long narrow areas lie along the Tennessee River and many of the larger tributaries in the southwestern part of the county. In part, the soil is covered by the Kentucky Reservoir. It is associated chiefly with Huntington and Melvin soils of the first bottoms, Wolftever soils of the low terraces, and Talbott soils of the uplands.

The soil is medium to strongly acid, high in content of organic matter and plant nutrients, and high in water-holding capacity. External drainage is very slow, and internal drainage is slow to very slow. The highly mottled subsoil indicates that the water table is alternately high and low.

Profile description:

0 to 12 inches, brown or grayish-brown friable silt loam, 10 to 18 inches thick.

12 inches +, friable silt loam or heavy silt loam highly mottled with gray, brown, and rust brown; 2 to 10 feet thick.

Present use and management.—About 60 percent of Lindside silt loam is cleared and used for crops. Use and management practices are similar to those for the associated Huntington soil, but yields average lower and occasionally the crops drown out. Most of the soil is kept in corn almost continuously, but occasionally hay (lespedeza or soybeans) or a cane crop is grown. Corn yields are high in favorable seasons but low in wet ones.

Use and management requirements.—The use suitability of Lindside silt loam is limited by imperfect drainage and by susceptibility to flooding. Artificial drainage would not broaden the use suitability much, because the soil cannot be protected from flooding. Artificial drainage should increase crop yields. The soil is well suited to corn, cane, and many of the summer annual hay crops. Fertilizer is not generally needed, because the supply of organic matter and plant nutrients is periodically replenished by fresh accumulations of sediments deposited by the floodwaters. Under good management practices, 35 bushels an acre of corn and 1.5 tons of lespedeza hay are expected.

Lindside silty clay loam (Lb).—This imperfectly drained young soil is on the low first bottoms. It occupies long narrow sloughlike areas along the Tennessee River or tributary streams and is associated with Egam, Melvin, Wolftever, and Talbott soils. It occupies nearly level to slightly depressed areas and has formed under a forest vegetation consisting chiefly of water-tolerant trees. The soil consists of mixed recent alluvium washed chiefly from upland soils underlain chiefly by limestone.

This is a medium-acid soil high in organic-matter content, plant nutrients, and water-holding capacity. The water table is alternately high and low. External drainage is very slow and internal drainage is slow to very slow. The soil is gravel-free in most places. Some of it is covered by the Kentucky Reservoir.

Profile description :

- 0 to 12 inches, dark grayish-brown to brown moderately friable silty clay loam, 10 to 18 inches thick.
- 12 to 22 inches, brownish-gray moderately friable silty clay loam spotted with gray and rust brown, 6 to 14 inches thick.
- 22 inches +, slightly compact silty clay loam highly mottled with gray, rust brown, and yellow ; 2 to 10 feet thick.

Present use and management.—About 70 percent of Lindsides silty clay loam is cleared and used for crops, but about 15 to 20 percent of this is left idle each year. Corn is the main crop, but some lespedeza, soybeans, and cane are grown. When the distribution of rainfall is favorable, crop yields are high; in wet seasons, however, they are low or crops are a complete failure.

Use and management requirements.—Lindsides silty clay loam is fairly well suited to corn, annual hay, and some other feed and forage crops, but its suitability is limited by imperfect drainage and susceptibility to flooding. Artificial drainage increases average crop yields but does not broaden use suitability. The tilth of this soil is poor, and the moisture range over which it can be tilled is narrow. If plowed wet, the soil puddles and becomes hard and cloddy upon drying. It also clods badly if plowed when too dry. The management will be concerned chiefly with selection of adapted varieties of crops and more timely and better tillage practices. Fertilization is not necessary in most places. Corn yields 30 bushels an acre under good management.

Lobelville silt loam (L₀).—This imperfectly drained soil of the first bottoms formed from general alluvium that washed from upland soils underlain by cherty limestone. The alluvium contains a small admixture of loess in most places. The soil has developed under a deciduous forest vegetation consisting largely of water-tolerant trees. It occupies nearly level, small, narrow areas along the larger streams in the cherty limestone hills section, where it is closely associated with Ennis soils of bottom lands, Greendale soils of colluvial lands, and Bodine, Mountview, and Dickson soils of uplands. Part of it is covered by the Kentucky Reservoir.

The soil is strongly to very strongly acid, moderately low in organic matter and plant nutrients, porous, and readily permeable when not saturated with water. The water table is alternately high and low, and the water-holding capacity is high. External drainage is very slow; internal drainage is slow.

Profile description :

- 0 to 12 inches, grayish-brown mellow silt loam, 8 to 16 inches thick.
- 12 to 25 inches, light-brown friable silt loam spotted with gray, rust brown, and yellow ; 5 to 15 inches thick.
- 25 inches +, bluish-gray silty clay loam spotted with yellow and rust brown; grades into very cherty material; 2 to 10 feet thick.

Chert fragments are scattered in the upper part of the profile in many places but not in numbers sufficient to interfere with cultivation. The quantity varies in the lower layers, but most places are very cherty.

Present use and management.—An estimated 80 percent of Lobelville silt loam is cleared, and of this 50 percent is used for corn, 20 percent for lespedeza hay, 10 percent for miscellaneous crops, and 20 percent for pasture or idle land. Farmers generally do not use

fertilizers and systematic crop rotations. Under common management practices, 20 bushels of corn and 0.8 ton of lespedeza an acre are average yields.

Use and management requirements.—Lobelville silt loam is suitable for crop production, but its value for such use is limited by periodic flooding and imperfect drainage. Artificial drainage would increase average crop yields but would not broaden the use suitability much, because of susceptibility to flooding. The drainage is imperfect but adequate for corn, sorghum, lespedeza, soybeans, and many other hay and pasture crops; however, occasional crop failures are to be expected.

Productivity can be increased considerably by proper fertilization and by rotating crops, but response is not so rapid as on the associated Ennis soils. Lime and phosphate are needed, especially for the legume crops; and potash is necessary, although the soil varies considerably in the need for it. If a short rotation that includes a legume or legume-grass mixture cannot be conveniently followed, a moderately high level of production can be maintained by adequate fertilization, including application of nitrogen. Under good management practices, 30 bushels an acre of corn and 1 ton of lespedeza hay are average yields.

Lobelville cherty silt loam (Lc).—Alluvium washed chiefly from uplands is the material from which this imperfectly drained soil of the bottom lands has formed. It differs from Lobelville silt loam chiefly in containing enough chert in the plow layer to interfere with cultivation. Development has been under a deciduous forest consisting mainly of water-tolerant trees. The soil occupies small nearly level areas along smaller streams throughout the cherty limestone hills section. Ennis, Greendale, Pace, Humphreys, and Bodine are closely associated soils. Some areas are covered by the Kentucky Reservoir.

The soil is cherty throughout; the chert fragments range from $\frac{1}{2}$ to 6 inches across but are for the most part less than 3 inches across. Reaction is strongly to very strongly acid. Content of organic matter and plant nutrients is moderately low. External drainage is very slow; internal drainage is slow. The water table is alternately high and low, but the mottling of the subsoil indicates that it is high much of the time.

Profile description:

- 0 to 12 inches, grayish-brown or brownish-gray friable cherty silt loam or cherty loam, 8 to 16 inches thick.
- 12 to 25 inches, light-brown to brownish-gray friable cherty silt loam spotted with gray, rust brown, and yellow; 5 to 15 inches thick.
- 25 inches +, gray or bluish-gray cherty silt loam spotted with yellow and rust brown; grades into very cherty material; 2 to 10 feet thick.

Present use and management.—Most of Lobelville cherty silt loam is cleared and used for crops or pasture. About 40 percent of the cleared area is in corn, 20 percent in lespedeza, 10 percent in miscellaneous crops, and 30 percent in pasture or idle land. Fertilizers and crop rotations are not generally used. Under common management practices 16 bushels of corn and 0.6 ton of lespedeza an acre are average yields.

Use and management requirements.—Owing to chertiness, imperfect drainage, and susceptibility to overflow, Lobelville cherty silt

loam is limited in use suitability and desirability for crops. Although similar to Lobelville silt loam in use and management requirements, it does not respond so readily to good management, and crop yields are less. Acreage yields of 20 bushels of corn and 0.8 ton of lespedeza hay are expected under good management.

Maury silty clay loam, eroded rolling phase (M_A).—This upland soil has developed from residuum of phosphatic limestone that is influenced in some places by thin beds of shale in the parent rock. The soil developed under a deciduous forest vegetation on 4- to 12-percent slopes. It is on lower ridge slopes in the limestone valleys, closely associated with Inman and Talbott soils and with stony land types of Talbott and Colbert soil materials (pl. 7, C'). Most of the acreage is in the southwestern part of the county.

The soil is medium to strongly acid, moderately high in most plant nutrients and especially high in phosphorus, and permeable to air, roots, and water. The drainage, both internally and externally, is moderate. The water-holding capacity is high. An occasional bedrock outcrop is not uncommon, but the soil is generally relatively free of stones or gravel. Numerous small concretions are in the subsoil and substratum.

Profile description :

0 to 6 inches, brown to reddish-brown friable silty clay loam, 0 to 10 inches thick.

6 to 32 inches, reddish-brown moderately plastic heavy silty clay loam or silty clay, 20 to 30 inches thick.

32 inches +, yellowish-brown or brown strongly plastic silty clay splotched with yellow and gray; bedrock at a depth of 5 to 10 feet.

As a considerable part of the original surface soil has eroded away, the present surface layer consists of remnants of the original surface layer mixed with the upper part of the subsoil. This mixing has made the present surface layer heavier in texture and variable in both color and texture. Small severely eroded spots are common and conspicuous, owing to exposure of the subsoil. The soils included with this mapping unit vary greatly in erosion condition; the largest acreage is moderately eroded, but some areas are uneroded and others are severely eroded. In large part the included soils have developed from the residuum of interbedded phosphatic limestone and shale and have grayish-brown to brownish-yellow surface soil and yellowish-brown subsoil. Their content of organic matter and plant nutrients is lower, but management requirements are about the same as for Maury silty clay loam.

Present use and management.—Practically all of the eroded rolling phase of Maury silty clay loam has been cleared and used for crops or pasture—20 percent for corn, 5 percent for cotton, 30 percent for hay and pasture, and 20 percent for miscellaneous crops. About 25 percent is idle land or wasteland. A variety of crops are grown, but they are not systematically rotated, and fertilizers are rarely if ever used. A few farmers have attempted to control erosion by using terraces or diversion ditches. Under ordinary management practices, 30 bushels of corn, 750 pounds of peanuts, and 1.2 tons of lespedeza hay an acre are expected.

Use and management requirements.—Maury silty clay loam, eroded rolling phase, is well suited to most of the common crops grown in the county. Although its tilth properties have been impaired, its

fertility lowered, and its moisture supply for growing plants lessened by erosion, this is still one of the most productive soils of the uplands. Management will be concerned chiefly with the supplying of needed elements and the preventing of further erosion. Nitrogen, the element most needed for high crop yields, can be supplied by using a legume crop in the rotation. Deep-rooted legumes, as alfalfa or sweet-clover, are well suited, but liming is necessary for good results. Phosphorus should not be needed for any crop, but potash may be required by the deep-rooted legumes and the crops following.

The soil is susceptible to accelerated erosion but it probably can be maintained in a rotation that includes a row crop only once in 4 years. Terraces and other mechanical means of erosion control should be an effective aid in checking runoff and erosion. The slopes are generally too short to consider strip cropping.

Acre yields expected under good management are 40 bushels of corn, 900 pounds of peanuts, and 1.8 tons of lespedeza hay. The soil is very well suited to pasture, and high-producing ones can be established and maintained without amendments.

Melvin silt loam (Mb).—This poorly drained soil of the bottom lands has formed from highly mixed general alluvium washed from upland soils underlain by a wide variety of rocks, limestone predominating. It occupies long narrow depressional or sloughlike areas on the flood plain of the Tennessee River or along tributary streams in the southwestern part of the county. It is associated with Lindsides, Egam, Huntington, Wolftever, and Sequatchie soils, and a small acreage along the larger streams in the cherty limestone hills section is associated with Ennis soils. Natural vegetation consists largely of water-tolerant trees such as willow, willow oak, tupelo gum, and cypress. The Kentucky Reservoir covers some of this soil.

The soil is medium to strongly acid. Its content of organic matter and plant nutrients is high. The water-holding capacity also is high. The soil is permeable, but the high water table keeps it waterlogged during rainy seasons. It is free of gravel or stone in most places.

Profile description:

0 to 6 inches, brownish-gray or gray friable silt loam or light silty clay loam spotted with light gray and rust brown; 4 to 8 inches thick.

6 to 18 inches, friable silt loam to silty clay loam highly mottled with gray, yellow, and rust brown; 10 to 20 inches thick.

18 inches +, bluish-gray silty clay loam; 2 to 10 feet thick.

A small acreage is included that has formed from alluvium washed chiefly from cherty limestone material. This inclusion is lighter in texture, more acid, and contains chert fragments throughout the profile in most places. Use and management requirements do not differ significantly from those for Melvin silt loam.

Present use and management.—Most of Melvin silt loam is still wooded, but a part is cleared for wild hay, late corn, sorghum, and pasture. Some of the cleared land is used and managed like the associated Lindsides and Huntington soils, but most of it is too poorly drained to be cultivated at the same time as those soils. Crop production is uncertain and failures are common.

Use and management requirements.—With its present drainage, Melvin silt loam is considered not suitable for crops requiring tillage but fairly well suited to pasture. The pasture is of low quality, however, and fertilization and seeding of better mixtures are needed to

produce better forage. If drained, the soil might become moderately to highly productive of corn, sorghum, and some hay crops, but it would still be susceptible to flooding. The soil should drain well, as it is permeable throughout, but the feasibility of draining it will be determined by actual response to drainage and on other factors.

Mines, pits, and dumps (M).—This land type consists of gravel pits and the dumps formed in clearing mine pits of overburden. The land has no present use for crops or pasture. Little or no forest vegetation has been established, as practically all of the excavation has taken place recently. Most of the pits are in cherty Bodine soils. The dumps consist of the less cherty material not suitable for road-surfacing material.

Mountview silt loam, rolling shallow phase (Mr).—Areas of this soil are on ridge crests or ridge slopes of 5 to 15 percent. The soil has developed from a thin layer of loess underlain by the residuum of cherty limestone. It differs from the rolling phase of Bodine cherty loam in having a relatively chert-free plow layer, and from the rolling phase of Dickson silt loam in having a thinner chert-free layer and no siltpan. Small areas occur throughout the cherty limestone hills section, chiefly in the less highly dissected parts, in close association with Dickson, Greendale, and Bodine soils. The natural vegetation is deciduous forest.

The soil is strongly to very strongly acid, low in organic matter and plant nutrients, fairly low in water-holding capacity, and permeable to air, roots, and water. Both external and internal drainage are moderate. The surface layer may contain some chert but not enough to interfere with cultivation. In most places the subsoil contains many angular chert fragments.

Profile description:

- 0 to 8 inches, grayish-yellow to yellowish-gray mellow silt loam, 6 to 12 inches thick.
- 8 to 24 inches, brownish-yellow friable silty clay loam grading into cherty light silty clay loam; 10 to 15 inches thick.
- 24 inches +, very cherty silt loam highly mottled with red, yellow, gray, and brown; 5 feet or more thick.

This soil is in many characteristics transitional between Bodine cherty loam, rolling phase, and Dickson silt loam, rolling phase. In many places it is located between them; consequently, small areas of these rolling phases are included in many places. Some areas having reddish-brown subsoil are also included.

Present use and management.—Practically all of Mountview silt loam, rolling shallow phase, is in forest that has been cut over and contains little marketable timber. Timber grows slowly, and yields are low.

Use and management requirements.—Mountview silt loam, rolling shallow phase, is fairly well suited to crops, but a large part is on ridge crests in long narrow areas isolated by areas of Bodine cherty loam, steep phase. If cleared, the soil is highly susceptible to erosion. A long rotation consisting chiefly of close-growing crops, as grasses and legumes, is desirable. Lime, phosphate, and potash will be needed for most crops. Nitrogen fertilizer will be required for all except the legume crop and the crop immediately following.

Special practices for control of runoff and erosion should not be necessary if a long rotation is used. Row crops, however, should

be planted and cultivated on the contour. Terraces may be necessary on some of the ridge slopes but should not be needed on the ridge crests. Under good management, 25 bushels of corn and 1.2 tons of lespedeza hay an acre are expected.

Mountview silt loam, eroded rolling shallow phase (Mo).—Derived from a thin layer of loess underlain by the residuum of cherty limestone, this soil is mainly in the less dissected parts of the cherty limestone hills section. In most places it is on ridge slopes below the Dickson soil, but in some areas it is on ridge crests in association with Bodine cherty loam, rolling phase. It has developed under a deciduous forest on slopes ranging from 5 to 15 percent. From the rolling shallow phase it differs in being moderately eroded. The chert-free layer is thinner, and scattered chert fragments may be on the surface and in the plow layer.

The soil is permeable to air, roots, and water, low in organic matter, plant nutrients, and water-holding capacity, and strongly to very strongly acid. The drainage, both internal and external, is moderate.

Profile description:

0 to 6 inches, grayish-yellow mellow silt loam, 0 to 8 inches thick.

6 to 24 inches, brownish-yellow friable silty clay loam grading into cherty light silty clay loam; 10 to 15 inches thick.

24 inches +, cherty silt loam highly mottled with red, yellow, gray, and brown; 5 feet or more thick.

Part of the original surface soil has been lost as a result of accelerated erosion. The thickness of the remaining surface soil is variable, and small areas of exposed subsoil are common. Some included areas contain enough chert in the plow layer to interfere with cultivation; others have a chert-free layer thicker than normal. A small acreage differs in having reddish-brown subsoil. These variations, however, do not significantly change the use and management requirements of the soil.

Present use and management.—All of the eroded rolling shallow phase of Mountview silt loam has been cleared and used for crops, and most of it is now being used for crops or pasture. Systematic crop rotation and fertilization are not commonly practiced. Under common management 14 bushels of corn and 0.6 ton of lespedeza hay an acre are expected.

Use and management requirements.—Mountview silt loam, eroded rolling shallow phase, is considered suitable for crop production, but it is susceptible to erosion, low in organic matter and plant nutrients, and strongly to very strongly acid. If used for crops, a long rotation that includes chiefly close-growing crops will probably be necessary. To protect it from further erosion, the soil should not be left bare for extended periods but should be sown in a cover crop as soon as possible after the row crop is removed.

Lime, phosphate, and probably potash are needed for most crops; nitrogen is needed for all crops except legumes and the crop immediately following. Good response is obtained from fertilization, but the effect does not last long. Cultivation should be on the contour, and contour strip cropping should be considered for the long slopes. Terraces may be necessary in places to control runoff and erosion; but if other management practices are adequate, terracing should not be needed. Acre yields of 20 bushels of corn, 500 pounds of peanuts, and 1 ton of lespedeza hay are expected under good management.

Mountview silt loam, hilly shallow phase (Me).—The parent material of this soil is derived from a thin layer of loess underlain by residuum of cherty limestone. The soil has developed under a deciduous forest consisting chiefly of oak. It differs from the rolling shallow phase in having steeper slopes—15 to 30 percent but mostly 20—and in having a thinner chert-free layer. Some chert is common in the surface layer. In most places this soil is on ridge slopes below the rolling shallow phase of Mountview silt loam or below the rolling phase of Dickson silt loam. It is widely distributed throughout the cherty limestone hills section but occurs mostly in the less highly dissected parts.

The soil is strongly to very strongly acid, low in organic matter and plant nutrients, and fairly low in water-holding capacity. It is permeable to air, roots, and water. Internal drainage is moderate and external drainage is rapid. The surface layer may contain some chert but not enough to interfere with cultivation. In most places the subsoil contains many chert fragments.

Profile description:

- 0 to 8 inches, grayish-yellow to yellowish-gray mellow silt loam, 6 to 12 inches thick.
- 8 to 20 inches, brownish-yellow friable cherty light silty clay loam, 8 to 12 inches thick.
- 20 inches +, very cherty silt loam highly mottled with red, gray, and brown; 5 feet or more thick.

Present use and management.—Most of Mountview silt loam, hilly shallow phase, is still in cut-over forest. The timber remaining is small and of poor quality. Timber grows slowly and produces low yields.

Use and management requirements.—Low fertility and susceptibility to erosion make the hilly shallow phase of Mountview silt loam poorly suited to crops requiring tillage. It is not naturally productive of pasture, but applications of lime, phosphate, nitrogen, and possibly potash should establish and maintain fair pasture.

Mountview silt loam, eroded hilly shallow phase (Mo).—Moderate erosion differentiates this soil from the hilly shallow phase. Part of the surface soil, including the thin surface layer of high organic-matter content, has been lost as a result of accelerated erosion. Like the hilly shallow phase, this one has developed from a thin layer of loess underlain by the residuum of cherty limestone. Slopes range from 15 to 30 percent, but most of them are less than 20 percent. Most areas are in the less highly dissected parts of the cherty limestone hills section, usually on ridge slopes below Mountview silt loam, eroded rolling shallow phase, or Dickson silt loam, rolling phase.

The soil is permeable and strongly to very strongly acid. Internal drainage is moderate, and external drainage is rapid. Organic-matter content, the supply of plant nutrients, and the water-holding capacity are low.

Profile description:

- 0 to 6 inches, grayish-yellow mellow silt loam, 0 to 8 inches thick.
- 6 to 20 inches, brownish-yellow friable cherty light silty clay loam, 8 to 12 inches thick.
- 20 inches +, cherty silt loam highly mottled with gray, yellow, red, and brown; 5 feet or more thick.

The thickness of the present surface soil is variable, and small areas of exposed subsoil are common. In the more eroded patches some chert

fragments are in the surface layer. A few severely eroded areas are included.

Present use and management.—All of the eroded hilly shallow phase of Mountview silt loam has been cleared at one time and used for field crops, but most of it is now idle or in pasture. Pastures are unimproved and of low carrying capacity. Crops are not systematically rotated, nor is fertilization generally practiced on the small acreage used for their production. In most places the soil is planted to corn or other intertilled crops until yields become very low, and then it is either abandoned or fenced and used for pasture.

Use and management requirements.—Mountview silt loam, eroded hilly shallow phase, is poorly suited to crop production because of its low fertility and susceptibility to erosion. If adequately fertilized with lime, phosphate, and potash, however, fair pasture can be established and maintained. Even though the pasture mixture should include legumes, nitrogen fertilizers are needed to establish the stand in most places.

Mountview silty clay loam, severely eroded rolling shallow phase (M₆).—Like other soils of the Mountview series, this well-drained phase is derived from a thin layer of loess underlain by residuum of cherty limestone. It developed under a deciduous forest vegetation on 5- to 15-percent slopes. It occurs in small areas widely distributed throughout the cherty limestone hills section. It is strongly to very strongly acid, low in organic matter and plant nutrients, and very low in water-holding capacity.

Profile description:

- 0 to 4 inches, grayish-yellow friable silt loam or silty clay loam, 0 to 8 inches thick.
- 4 to 22 inches, brownish-yellow friable silty clay loam grading into cherty light silty clay loam; 10 to 15 inches thick.
- 22 inches +, cherty silt loam highly mottled with red, yellow, gray, and brown; 5 feet or more thick.

The present surface layer consists of remnants of the original surface layer (most of which has been lost by erosion) mixed with the upper part of the subsoil. The surface layer has not been uniformly removed, and in some places the plow layer may be entirely within the original surface layer. The texture of the present surface soil therefore ranges from silt loam to light silty clay loam. The loss of material has exposed the underlying cherty layers in many places, and frequently shallow gullies have penetrated the subsoil. A few small areas have been included that have chert fragments in the surface layer in numbers sufficient to interfere with cultivation. Also included are small areas that have a thicker chert-free layer and a siltpan.

Present use and management.—All of the severely eroded rolling shallow phase of Mountview silty clay loam has been cleared and used for crops, but most of it is now idle or in pasture. The pasture is unimproved and has a very low carrying capacity.

Use and management requirements.—Mountview silty clay loam, severely eroded rolling shallow phase, is poorly suited to crops and pasture because it is severely eroded. On most farms it probably can be used to best advantage for pasture. To establish and maintain a good pasture mixture, lime, phosphate, and possibly potash will be needed. Manuring or mulching will aid on the more eroded areas.

The pasture mixture should include legumes, but even if it does, an application of nitrogen fertilizer will be needed to establish the stand of forage plants. The carrying capacity of the pasture will probably be low, even with good management.

Needmore silt loam, rolling phase (N_B).—This upland soil differs from the Dandridge soils in being deeper over bedrock and in having well-developed surface soil and subsoil layers. The parent material is developed from the residuum of calcareous shale and is influenced to some extent by an admixture of loess. The soil has developed on 5- to 15-percent slopes under a deciduous forest vegetation. Areas are on narrow ridge crests or in a semicolluvial foot-slope position. The soil occurs chiefly in uplands adjacent to the Buffalo River and to the creeks east of the river, especially Brush and Coon Creeks. Dandridge, Bodine, Mountview, and Talbott are closely associated soils.

In reaction this soil is strongly to very strongly acid. Its content of organic matter and plant nutrients is moderately low. Drainage, both internal and external, is moderate. The soil is permeable to air, roots, and water but its water-holding capacity is low.

Profile description:

0 to 8 inches, yellowish-gray to grayish-yellow mellow silt loam, 6 to 10 inches thick.

8 to 22 inches, brownish-yellow to yellow moderately friable silty clay loam, 10 to 20 inches thick.

22 inches +, pale-yellow shaly silty loam splotted with gray; 4 to 12 inches thick; calcareous shale bedrock at 30 to 40 inches in most places.

Small shale fragments are scattered throughout, and chert fragments from higher lying Bodine soils are on the surface in many places.

Present use and management.—Practically all of the rolling phase of Needmore silt loam is in forest consisting of red and white oaks, hickory, beech, and black walnut. The forest has been cut over and burned over many times and consequently the present stand is small and contains many culls. The trees grow comparatively fast.

Use and management requirements.—Needmore silt loam, rolling phase, is suitable for crops and pasture, but because it is moderately low in fertility and water-holding capacity, yields of most crops are low. The greatest drawback to its use is the inaccessibility of most areas and the fact that they are very small and associated with Fourth- and Fifth-class soils. On most farms the best use is forest. If this phase were cleared, use and management would be similar to that for Needmore silt loam, eroded rolling phase.

Needmore silt loam, eroded rolling phase (N_A).—This upland soil has developed from the residuum of calcareous shale. In most places this parent material is influenced to some extent by a small admixture of loess. The soil differs from the rolling phase in being moderately eroded. It occurs chiefly on narrow ridge crests or on semicolluvial foot slopes in upland areas adjacent to the Buffalo River and the creeks east of the river, especially Brush and Coon Creeks. Slopes range from 5 to 15 percent. The Dandridge, Bodine, Mountview, and Talbott are closely associated soils.

Small shale fragments are scattered throughout, and some have accumulated on the surface. The soil is strongly to very strongly acid, low in plant nutrients, organic matter, and water-holding capacity,

and permeable to air, roots, and water. Both internal and external drainage are moderate.

Profile description:

0 to 6 inches, grayish-yellow to brownish-yellow friable silt loam, 0 to 8 inches thick.

6 to 20 inches, brownish-yellow to yellow moderately friable silty clay loam, 10 to 20 inches thick.

20 inches +, pale-yellow shaly silty clay loam splotted with gray; 4 to 12 inches thick; calcareous shale bedrock at 30 to 40 inches in most places.

A considerable part of the original surface soil, including the thin surface layer of higher organic-matter content, has been eroded away. Exposure of the subsoil has made small severely eroded spots common and conspicuous. In many places part of the subsoil has been mixed with remnants of the original surface soil. This mixing influences the color but not the texture of the present surface layer.

Present use and management.—All of Needmore silt loam, eroded rolling phase, has been cleared and used for crops and pasture. Now, an estimated 60 percent is in pasture and 20 percent is in miscellaneous crops; the rest is idle. Crop yields are low, but pasture gives fair yields.

Use and management requirements.—The eroded rolling phase of Needmore silt loam is somewhat inferior to the rolling phase for crop production. The supply of organic matter and plant nutrients has been depleted by cropping and erosion. The water-holding capacity is lower, and crops are more susceptible to droughts. Although the soil is suitable for crops, it generally occurs in small inaccessible areas associated with Fourth- and Fifth-class soils. On most farms it is impractical to use the land for anything but pasture. Fair to good pasture is easily established, but much better pasture can be developed by using improved management practices, particularly fertilization. Good response to lime, phosphate, and potash is expected.

If the soil is used for crops, management requirements are much more exacting and should include systematic crop rotations and proper and adequate fertilization. A long rotation consisting chiefly of close-growing crops, including legumes, will be needed. Lime and phosphorus give good results when applied for legumes, especially deep-rooted ones. Most crops will respond to phosphorus; nitrogen is needed for all except the legume crop and the crop immediately following. Contour tillage is advisable if at all feasible. Mechanical means of runoff control, as terraces, are not practical in many places. Under good management, 20 bushels of corn and 1 ton of lespedeza an acre are average expectable yields.

Pace cherty silt loam, rolling phase (Po).—Local alluvium or colluvium washed from upland soils underlain by cherty limestone is the material on which this soil developed. It differs from Greendale cherty loam, rolling phase, in being older and less productive and in having well-developed surface soil and subsoil layers. It is susceptible to erosion, whereas the Greendale soils receive additional sediment at frequent intervals. Areas are widely distributed throughout the county on 5- to 15-percent slopes, but most of them are in the cherty limestone hills section. Individual areas are small and closely associated with Greendale, Ennis, Humphreys, and Bodine soils. The native vegetation is deciduous forest.

This soil is strongly acid, moderately low in organic matter and plant nutrients, and low in water-holding capacity. Internal and external drainage are moderate. The profile is cherty throughout, and the chert in the plow layer is sufficient to interfere with cultivation.

Profile description:

- 0 to 8 inches, grayish-brown to brownish-gray friable cherty silt loam, 6 to 10 inches thick.
- 8 to 30 inches, yellowish-brown to brownish-yellow friable cherty silty clay loam, 16 to 24 inches thick.
- 30 inches +, brownish-yellow or pale-yellow friable (slightly compact in places) cherty silty clay loam splotted with gray and yellow; 1 to 5 feet thick.

In some places soils with weak silt pans are included.

Present use and management.—Practically all of the rolling phase of Pace cherty silt loam is in forest of red and white oaks and hickory. Tree growth is fair, but the present stand is small and includes many cull trees. The forest is cut and burned over at frequent intervals.

Use and management requirements.—Pace cherty silt loam, rolling phase, is suitable for crops or pasture but its low fertility and low water-holding capacity make it moderately low in productivity for most crops. The areas are usually small and they are associated in such a manner that it is not feasible to use many of them for crops or pasture. Use and management practices on cleared areas are similar to those for the eroded rolling phase.

Pace cherty silt loam, eroded rolling phase (P_A).—This well to moderately well drained cherty soil is derived from local alluvium or colluvium washed from upland soils underlain by cherty limestone. It differs from the rolling phase in being moderately eroded. Slopes range from 5 to 15 percent. The areas are small and distributed through the county; most of them are in the cherty limestone hills section closely associated with Bodine, Greendale, Ennis, and Humphreys soils.

The soil is strongly to very strongly acid, low in water-holding capacity and organic matter, and moderately low in plant nutrients. It is cherty throughout; the plow layer contains chert in quantities sufficient to interfere with tillage. Both internal and external drainage are moderate.

Profile description:

- 0 to 6 inches, grayish-brown to grayish-yellow friable cherty silt loam, 0 to 8 inches thick.
- 6 to 28 inches, yellowish-brown to brownish-yellow friable cherty silty clay loam, 16 to 24 inches thick.
- 28 inches +, brownish-yellow or pale-yellow friable (slightly compact in places) cherty silty clay loam splotted with gray and yellow; 1 to 5 feet thick.

A substantial part of the original surface soil has been eroded away, and as a result there is an accumulation of chert on the surface and in the plow layer. Some subsoil material has been mixed with the surface layer, and the present surface layer is therefore variable in color and somewhat heavier in texture in places.

Present use and management.—All of the eroded rolling phase of Pace cherty silt loam has been cleared and used for crops or pasture. About 30 percent is idle each year. Corn and lespedeza are the principal crops, although a considerable acreage is in miscellaneous crops,

orchards, gardens, or pasture. No regular rotation is followed, and fertilizers are not commonly used. Under ordinary management practices, 18 bushels of corn and 0.7 ton of lespedeza hay an acre are average yields.

Use and management requirements.—Pace cherty silt loam, eroded rolling phase, is suitable for crops but generally less productive than the associated Greendale soils. Crops are injured by droughts during extended dry seasons. If a rotation of moderate length is used and a cover crop follows all intertilled crops, special measure for erosion control should not be necessary. Productivity probably can be maintained or increased under a 4-year rotation that includes legumes, preferably deep-rooted legumes. The legumes, however, must be adequately fertilized with lime and phosphate.

All crops should respond well to phosphate, and all except the legume crop and the crop immediately following should respond to nitrogen. Red clover and like legumes, properly fertilized and inoculated, should fix nitrogen enough to maintain high-level yields of other crops in the rotation. Some crops may need potash, especially if yields are maintained at a high level. Barnyard manure is an excellent source of both nitrogen and potash and will also add valuable organic matter to the soil. Under good management, 25 bushels of corn, 0.9 ton of lespedeza hay, and 500 pounds of peanuts an acre are expected.

Pace cherty silt loam, severely eroded rolling phase (Pp).—This colluvial soil differs from the eroded rolling phase chiefly in having lost more of the surface layer as a result of erosion. The parent material is local alluvium or colluvium washed from upland soils underlain by cherty limestone. Slopes range from 5 to 15 percent. Areas are distributed throughout the county, but most of them are in the cherty limestone hills section. The soil is closely associated with Bodine, Greendale, Ennis, and Humphreys soils.

The soil is strongly to very strongly acid and low in water-holding capacity, organic matter, and plant nutrients. Surface runoff is moderately rapid, and internal drainage is moderate.

Profile description:

- 0 to 4 inches, grayish-brown to brownish-yellow friable cherty silt loam, 0 to 6 inches thick.
- 4 to 26 inches, yellowish-brown to brownish-yellow friable cherty silty clay loam, 16 to 24 inches thick.
- 26 inches +, brownish-yellow or pale-yellow friable (slightly compact in places) cherty silty clay loam splotted with gray and yellow; 1 to 5 feet thick.

As most of the original surface layer and part of the subsoil have been lost through erosion, the plow layer consists largely of subsoil material. Shallow gullies are common, but on the intergully areas a considerable part of the original surface soil remains. Because the finer material has eroded away, chert fragments have accumulated on the surface and in the plow layer.

Present use and management.—All of the severely eroded rolling phase of Pace cherty silt loam has been cleared and used for crops and pasture, but yields are very low. Much of the soil now is idle land or wasteland. A considerable part is in unimproved pasture; very little is used for crops.

Use and management requirements.—In its present condition Pace cherty silt loam, severely eroded rolling phase, is not productive of either crops or pasture, but on most farms it can be best used for pasture. Lime and phosphate are required to establish and maintain good pasture. Nitrogen may be needed to establish the pasture mixture, but once the stand is established, the legumes should fix adequate nitrogen.

Mechanical means of water control may be necessary until the pasture is well established. Terraces or diversion ditches to divert water from adjacent slopes may be advisable. Check dams in the gullies will aid in getting a vegetative cover established. A mulch of barnyard manure on the galled spots may be necessary to establish the stand. After several years in a well-managed pasture, this soil probably can be used for crops, and management will be similar to that for the eroded rolling phase.

Pace cherty silt loam, eroded undulating phase (Pa).—This moderately well to well-drained soil of the colluvial land is derived from local alluvial or colluvial material washed from upland soils underlain by cherty limestone. It differs from Greendale cherty loam, undulating phase, in being older and in having well-developed surface soil and subsoil layers. It developed on 2- to 5-percent slopes under a deciduous forest vegetation. The acreage is widely distributed throughout the county, but most of it is in the cherty limestone hills section in close association with Bodine, Greendale, Ennis, and Humphreys soils.

The soil is strongly to very strongly acid and its content of organic matter and plant nutrients is moderately low. It is cherty throughout, there being sufficient chert in the plow layer to interfere with cultivation. Drainage, both internal and external, is moderate. The water-holding capacity is low.

Profile description:

- 0 to 6 inches, grayish-brown to grayish-yellow friable cherty silt loam, 0 to 8 inches thick.
- 6 to 30 inches, yellowish-brown to brownish-yellow friable cherty silty clay loam, 16 to 26 inches thick.
- 30 inches +, brownish-yellow or pale-yellow friable (slightly compact in places) cherty silty clay loam splotched with gray and yellow; 1 to 5 feet thick.

A considerable part of the original surface soil has been lost through erosion, and in many places a part of the subsoil has been mixed with the remnants of the original surface layer. The present layer is variable in color. Small included areas are uneroded or only slightly eroded.

Present use and management.—Most of the eroded undulating phase of Pace cherty silt loam is cleared and used for crops and pasture; 20 to 30 percent is idle land; and the rest is in corn, lespedeza, miscellaneous crops, orchards, gardens, or pasture. Systematic crop rotation and fertilization are not general practices. Under common management, 20 bushels of corn, 500 pounds of peanuts, and 0.9 ton of lespedeza hay an acre are average yields.

Use and management requirements.—Pace cherty silt loam, eroded undulating phase, is somewhat better suited to crop production than the rolling phase because it is less susceptible to erosion, is in some-

what larger individual areas, and is easier to till. Use and management are somewhat similar, but this soil can be maintained under a shorter rotation and the water-control problem is not so serious. Under a good management program, 30 bushels of corn, 700 pounds of peanuts, and 1.2 tons of lespedeza hay an acre are average expectable yields.

Paden silt loam, rolling phase (Pg).—Stronger slopes of 5 to 15 percent differentiate this siltpan soil of the terrace lands from the undulating phase. The parent material consists of loesslike silt underlain by highly mixed alluvium washed predominantly from soils underlain by limestone, or it may consist of varying mixtures of the two. Development has been under a deciduous forest vegetation. The soil occupies old high terraces along the Tennessee and Buffalo Rivers in the Ennis-Humphreys-Pickwick and the Pickwick-Paden-Etowah soil associations. It is closely associated with Pickwick, Etowah, Taft, and Robertsville soils.

This soil is very strongly acid and low in organic matter, plant nutrients, and water-holding capacity. The surface soil and subsoil are permeable to air, roots, and water, but the siltpan is only slightly permeable. External drainage is moderate, but internal drainage is moderately slow. Both surface and subsoil layers are free of gravel.

Profile characteristics:

- 0 to 8 inches, yellowish-gray to grayish-yellow mellow silt loam, 6 to 10 inches thick.
- 8 to 24 inches, yellowish-brown to brownish-yellow friable silty clay loam, 16 to 22 inches thick.
- 24 to 40 inches (siltpan), compact silty clay loam mottled with gray, yellow, and brown, 14 to 18 inches thick.
- 40 inches +, moderately friable silty clay loam mottled with red, yellow, and gray; 2 to 10 feet thick.

Present use and management.—Most of Paden silt loam, rolling phase, is forested with white, red, post, and blackjack oaks and hickory. The forest has been cut over, and the present stand is small and includes many cull trees. Trees grow slowly.

Use and management requirements.—Stronger slopes make Paden silt loam, rolling phase, inferior to the undulating phase for crop production. If cleared of its forest cover, it is very susceptible to erosion. The rotation should be longer and include more close-growing crops. Cultivation needs to be on the contour, and contour strip cropping is advisable on the long slopes. Terraces should aid in checking runoff. Use and management is similar to that for the eroded rolling phase of Paden silt loam.

Paden silt loam, eroded rolling phase (Pe).—This siltpan soil of the terrace lands developed on 5- to 15-percent slopes under deciduous forest. The material from which it is formed consists of loess or varying mixtures of loess and old alluvium. The alluvium has washed from upland soils underlain by a variety of rocks, including limestone. The small areas are on high terraces principally along the Tennessee and Buffalo Rivers. The largest acreages occur in the southwestern part of the county in association with Pickwick, Taft, Robertsville, and Humphreys soils of the terrace lands and Ennis, Lindsides, and Melvin soils of the bottom lands.

The soil is very strongly acid and low in organic matter, plant nutrients, and water-holding capacity. The surface soil and subsoil

are permeable to air, roots, and water, but the siltpan is only slightly permeable. External drainage is moderate; internal drainage, moderately slow.

Profile description :

- 0 to 6 inches, grayish-yellow mellow silt loam, 0 to 8 inches thick.
- 6 to 22 inches, yellowish-brown to brownish-yellow friable silty clay loam, 16 to 22 inches thick.
- 22 to 38 inches (siltpan), compact silty clay loam mottled with gray, yellow, and brown; 14 to 20 inches thick.
- 38 inches +, moderately friable silty clay loam mottled with red, brown, yellow, and gray; 2 to 10 feet thick.

A substantial part of the original surface soil has been lost as a result of erosion. In some places the plow layer consists of subsoil mixed with remnants of the original surface soil. The original surface soil, however, constitutes the plow layer over most of the areas. A few severely eroded spots are conspicuous because of the exposed subsoil.

Present use and management.—About 10 percent of Paden silt loam, eroded rolling phase, is used for corn, 5 percent for cotton, 5 percent for peanuts, 25 percent for hay and pasture, and 15 percent for miscellaneous crops. Some 40 percent is idle. Crops are not rotated systematically, nor is fertilization commonly practiced. Under ordinary management 16 bushels of corn, 220 pounds of cotton, and 0.7 ton of lespedeza hay are average acre yields.

Use and management requirements.—Paden silt loam, eroded rolling phase, is suited to most crops grown in the county, but its naturally low productivity has been decreased by continuous cropping and erosion. Management, concerned chiefly with increasing productivity and controlling erosion, should include use of a long rotation consisting of close-growing crops, including legumes. Application of lime, phosphate, nitrogen, and potash should be made in this rotation. A legume crop in the rotation adds valuable nitrogen and organic matter. It is desirable to follow all intertilled crops with a winter cover. Row crops should be planted on the contour where feasible; terraces are most effective in runoff and erosion control if used with other good management practices. Corn yields 25 bushels, cotton 380 pounds, and lespedeza hay 1.2 tons an acre, under good management practices.

Paden silt loam, undulating phase (PH).—The parent material of this soil consists of varying mixtures of alluvium and loess. The old general stream alluvium consists of materials washed from soils of the uplands underlain by a wide variety of rocks, including limestone. The loess occurs as a thin layer that covers the old alluvium in most places.

This siltpan soil is moderately well-drained and has developed on 2- to 5-percent slopes under a deciduous forest. Areas are on high terraces along the Tennessee and Buffalo Rivers, where they are associated chiefly with Pickwick, Taft, and Robertsville soils. The soil is in the Pickwick-Paden-Etowah and Ennis-Humphreys-Pickwick soil associations.

The soil is very strongly acid and low in organic matter, plant nutrients, and water-holding capacity. The surface soil and subsoil are permeable to air, roots, and water, but the siltpan is only slightly permeable. External drainage is moderate, but internal drainage is moderately slow.

Profile description :

- 0 to 8 inches, yellowish-gray to grayish-yellow mellow silt loam, 6 to 10 inches thick.
- 8 to 24 inches, yellowish-brown to brownish-yellow friable silty clay loam, 18 to 22 inches thick.
- 24 to 42 inches (siltpan), compact silty clay loam mottled with gray, yellow, and brown; 16 to 20 inches thick.
- 42 inches +, moderately friable silty clay loam mottled with red, brown, yellow, and gray; 2 to 10 feet thick.

The upper soil layers are free of gravel, but the one below the siltpan is gravelly in places. A significant acreage is included that is slightly eroded, but its use and management requirements do not differ greatly.

Present use and management.—Most of Paden silt loam, undulating phase, is in oak forest. The cleared areas are used for crops and pasture. The principal crops—corn, cotton, peanuts, and lespedeza—are not grown in any systematic rotation, nor are they adequately fertilized. Forest has been cut over, and the present stand is small and includes many cull trees.

Use and management requirements.—The undulating phase of Paden silt loam is well suited to most of the common field crops of the county, but low fertility and water-holding capacity make it only moderately productive. Use suitability is somewhat limited by the slow internal drainage. Rotation of crops and adequate fertilization are required to maintain or increase productivity. The rotation can be fairly short but should include a legume crop or a legume-grass mixture. A cover crop, preferably a legume, should follow all inter-tilled crops.

Lime, phosphate, and potash are necessary for legume crops, and nitrogen is needed for all except the legume and the crop immediately following. Cotton and grain crops respond well to a complete fertilizer. Owing to the low water-holding capacity, the summer crops are often injured by drought. Small grains give proportionally higher yields because they mature during the season of higher rainfall. Under good management practices, 35 bushels of corn, 440 pounds of cotton, and 1.5 tons of lespedeza hay an acre are expected.

Paden silt loam, eroded undulating phase (Pr).—This siltpan soil of the terrace lands has developed under a deciduous forest on 2- to 5-percent slopes. Its parent material consists chiefly of wind-blown silt but contains varying quantities of mixed alluvium. Areas are on old high terraces along the Tennessee and Buffalo Rivers in close association with Pickwick, Taft, and Robertsville soils.

The soil is very strongly acid and low in organic matter, plant nutrients, and water-holding capacity. The surface soil and subsoil layers are permeable to air, roots, and water, but the siltpan is only slightly permeable. External drainage is moderate; but internal drainage is moderately slow.

Profile description :

- 0 to 6 inches, yellowish-gray to grayish-yellow mellow silt loam, 0 to 8 inches thick.
- 6 to 22 inches, yellowish-brown to brownish-yellow friable silty clay loam, 16 to 22 inches thick.
- 22 to 40 inches (siltpan), compact silty clay loam mottled with gray, yellow, and brown; 16 to 20 inches thick.
- 40 inches +, moderately friable silty clay loam mottled with red, brown, yellow, and gray; 2 to 10 feet thick.

Much of the original surface soil has been eroded away. In places the subsoil has mixed with the original surface soil in the plow layer. A few severely eroded spots are conspicuous because the subsoil is exposed. The material below the siltpan contains considerable gravel in some places.

Present use and management.—All of Paden silt loam, eroded undulating phase, has been cleared and used for crops and pasture. About 5 percent is used for cotton, 5 percent for peanuts, 20 percent for corn, 20 percent for miscellaneous crops, and 25 percent for hay and pasture. Approximately 25 percent is idle land. The crops are not rotated systematically, and although some fertilizer is used on cotton, fertilization is not a common practice. Under present management, 18 bushels of corn, 240 pounds of cotton, and 0.8 ton of lespedeza hay are average acre yields.

Use and management requirements.—Paden silt loam, eroded undulating phase, is suited to most crops commonly grown in the county. It is naturally low in productivity, and continuous cropping and erosion have further reduced yields. Crop rotations and adequate fertilization are required to maintain or increase productivity. The rotation can be short but should include a legume or legume-grass mixture. A deep-rooted legume is preferred, but alfalfa and red clover are difficult to establish and maintain. A cover crop, preferably vetch, crimson clover, or a like legume, should follow all intertilled crops.

Lime, phosphate, and potash are necessary for the legume crop; nitrogen is needed for all except the legume and the crop immediately following. A good response is expected from the use of a complete fertilizer for cotton and small grains. Special measures should not be necessary for erosion control, but all tillage should be on the contour if feasible. Under good management practices, 30 bushels of corn, 400 pounds of cotton, and 1.4 tons of lespedeza hay are expected acre yields.

Paden silty clay loam, severely eroded rolling phase (Pk).—Areas of this siltpan soil occupy slopes of 5 to 15 percent. They are on old high Tennessee or Buffalo River terraces, chiefly in the southwestern part of the county and in close association with Pickwick, Etowah, Taft, and Robertsville soils. The parent material consists of loesslike silt underlain by highly mixed alluvium (chiefly limestone) or varying mixtures of loess and alluvium.

The soil is very strongly acid and low in organic matter, plant nutrients, and water-holding capacity. The surface soil and subsoil are permeable to air, roots, and water, but the siltpan is only slightly permeable. External drainage is moderate to rapid; internal drainage is moderately slow.

Profile description:

- 0 to 4 inches, grayish-yellow to brownish-yellow friable silty clay loam, 0 to 6 inches thick.
- 4 to 20 inches, yellowish-brown to brownish-yellow friable silty clay loam, 16 to 22 inches thick.
- 20 to 36 inches (siltpan), compact silty clay loam mottled with gray, yellow, and brown; 14 to 20 inches thick.
- 36 inches +, moderately friable silty clay loam mottled with red, brown, yellow, and gray; 2 to 10 feet thick.

Most of the original surface layer and a part of the subsoil have been lost as a result of erosion. The soil is characterized by numerous

shallow gullies and by retaining a considerable part of the original surface layers in areas between gullies. Mixing of subsoil with remnants of the original surface soil during tillage has made the present surface layer heavier textured over much of the area.

Present use and management.—All of Paden silty clay loam, severely eroded rolling phase, has been cleared and used for crops or pasture, but most of it is now idle or used for unimproved pasture. A small part is in crops, but yields, as for pasture, are extremely low. A few farmers have attempted to check erosion by using terraces, but not many of these attempts have been accompanied by an improved system of cropping or by fertilization.

Use and management requirements.—The severely eroded rolling phase of Paden silty clay loam is considered unsuitable for crops requiring tillage and poorly suitable for pasture. It is difficult to reforest, and the forest cover is very slow to establish itself naturally. Under present conditions the soil is probably best used for pasture on most farms, but to obtain fair yields, phosphate, nitrogen, lime, and potash will be required. The soil should be seeded to heavy sod-forming pasture mixtures that include legumes. Grazing must be carefully regulated to maintain a good sod. After a few years in a well-managed pasture, the soil may be suited to crops. If so, management requirements would be similar to those for Paden silt loam, eroded rolling phase.

Pickwick silt loam, rolling phase (P_N).—This well-drained soil developed on 5- to 15-percent slopes under a deciduous forest. The parent material consists of loess or loesslike silt underlain by old alluvium or varying mixtures of the two. The alluvium has washed partly from soils underlain by limestone. Areas are on old high terraces of the Tennessee and Buffalo Rivers, chiefly in the Pickwick-Paden-Etowah and Ennis-Humphreys-Pickwick soil associations and in close association with Paden, Etowah, and other Pickwick soils.

The soil is moderately high in organic matter and plant nutrients and high in water-holding capacity. It is medium to strongly acid and readily permeable to air, roots, and water. Drainage, both internal and external, is moderate.

Profile description:

0 to 10 inches, grayish-brown or brownish-gray mellow silt loam, 8 to 12 inches thick.

10 to 32 inches, light reddish-brown or yellowish-brown friable silty clay loam, 18 to 24 inches thick.

32 inches +, reddish-brown to brownish-red moderately friable silty clay loam spotted with gray and yellow; 2 to 10 feet or more thick.

The soil is relatively free of gravel in the surface and subsoil layers, but the substratum contains considerable gravel in places. Small areas are included that differ in having 2- to 5-percent slopes. A small acreage is cleared and slightly eroded.

Present use and management.—Most of Pickwick silt loam, rolling phase, is in forest of white and red oaks and hickory. This forest has been cut over; the trees are small and many cull trees are included. Tree growth is fairly rapid.

Use and management requirements.—The rolling phase of Pickwick silt loam is well suited to the common crops grown in the county, including the deep-rooted legumes. Its good moisture relations and

moderately high fertility make it naturally productive and very responsive to good management practices. The cleared soil is susceptible to erosion, and management is concerned with preventing the loss of soil material and maintaining or increasing the supply of available plant nutrients. Use and management practices are similar to those for the eroded rolling phase.

Pickwick silt loam, eroded rolling phase (Pl).—This soil is on 5- to 15-percent slopes on old high terraces of the Tennessee or Buffalo Rivers. It is associated with Etowah, Paden, Taft, and Robertsville soils. The parent material consists of loess or loesslike silt underlain by highly mixed old alluvium or of varying mixtures of the two materials. The old alluvium came partly from soils underlain by limestone. The soil is largely confined to the Pickwick-Paden-Etowah and Ennis-Humphreys-Pickwick soil associations.

Reaction is strongly acid, organic-matter content is moderate, plant-nutrient content is moderately high, and water-holding capacity is high. The soil is permeable to air, roots, and water. Both internal and external drainage are moderate. The surface soil and subsoil layers are free of gravel, but the substratum is gravelly in some places.

Profile description:

0 to 6 inches, grayish-brown to yellowish-brown mellow silt loam, 0 to 8 inches thick.

6 to 32 inches, light reddish-brown or yellowish-brown friable silty clay loam, 18 to 24 inches thick.

32 inches +, reddish-brown to brownish-red moderately friable silty clay loam spotted with gray and yellow; 2 to 10 feet or more thick.

The original surface layer, a considerable part of which has been lost through erosion, has been mixed with the subsoil during tillage and as a result is highly variable in color and texture. Small severely eroded spots exposing the subsoil are common and conspicuous. The texture of the more eroded parts is a silty clay loam.

Present use and management.—All areas of Pickwick silt loam, eroded rolling phase, are cleared and have been used for crops. About 5 percent is used for cotton, 10 percent for corn, 10 percent for miscellaneous crops, and 60 percent for hay or pasture. Approximately 15 percent is idle land or wasteland. The immediate needs of the farmer usually determine which of a variety of crops is grown. Cotton is fertilized with about 200 pounds an acre of fertilizer, as 4-10-4,⁵ in most places. Some lime and phosphate have been used on hay crops. Average yields an acre under ordinary management are 22 bushels of corn, 280 pounds of cotton, and 1 ton of lespedeza hay.

Use and management requirements.—Although tilth properties have been impaired, fertility is lower, and moisture supply for plants is less than for the rolling phase, the eroded rolling phase of Pickwick silt loam is well suited to all the common field crops grown in the county. It is responsive to good management, and under proper management its productivity can be greatly increased. A rotation of moderate length that includes a deep-rooted legume is desirable in any improved management program.

Lime and phosphate are required for alfalfa, red clover, or other deep-rooted legumes in most places. Phosphate is needed for high

⁵ Percentages, respectively, of nitrogen, phosphoric acid, and potash.

yields of all crops; the need for potash depends on the crop to be grown and those previously grown. Legumes supply an adequate quantity of nitrogen for the other crops grown in a moderate to short rotation. Terraces are effective in controlling erosion and are needed unless the soil is used for close-growing crops most of the time. Contour tillage should be followed wherever feasible. Under good management, 35 bushels of corn, 420 pounds of cotton, and 1.6 tons of lespedeza hay an acre are expected.

Pickwick silt loam, eroded undulating phase (Pm).—Loess or loesslike silt underlain by old mixed alluvium or various mixtures of loess and alluvium is the parent material for this soil. The soil is on 2- to 5-percent slopes and closely associated with Etowah, Paden, Taft, and Robertsville soils. It occurs on old high terraces along the Tennessee and Buffalo Rivers, largely in the Pickwick-Paden-Etowah and Ennis-Humphreys-Pickwick soil associations.

The soil is moderate in content of organic matter, moderately high in plant nutrients and water-holding capacity, and strongly acid. Drainage, both internal and external, is moderate. The surface soil and subsoil are relatively free of gravel.

Profile description:

0 to 6 inches, grayish-brown to yellowish-brown and mellow silt loam, 0 to 8 inches thick.

6 to 32 inches, light reddish-brown or yellowish-brown friable silty clay loam, 20 to 30 inches thick.

32 inches +, reddish-brown to brownish-red moderately friable silty clay loam spotted with gray and yellow; 2 to 10 feet or more thick.

Much of the original surface layer has been lost as a result of erosion. Small severely eroded spots exposing the subsoil are common and conspicuous. In most places mixing of subsoil with the original surface layer has not significantly changed the texture of the present surface layer. Exceptions to this are the more severely eroded spots, where the mixing is naturally more extensive.

Present use and management.—All of the eroded undulating phase of Pickwick silt loam is cleared. About 5 percent is used for cotton, 5 percent for peanuts, 15 percent for corn, 15 percent for miscellaneous crops, and 50 percent for hay and pasture. About 10 percent is idle. Crops are not systematically rotated; fertilization is commonly practiced only for cash crops. Under common management average yields are 25 bushels of corn, 320 pounds of cotton, and 1.2 tons of lespedeza hay an acre.

Use and management practices.—If it is properly fertilized, relatively high yields of all the common field crops, including deep-rooted legumes, can be obtained on Pickwick silt loam, eroded undulating phase. Even though the soil is moderately well supplied with plant nutrients, fertilization is necessary for continued high yields. Use and management requirements are similar to those for the eroded rolling phase, but the rotation can be shorter and include more intertilled crops. Mechanical means of erosion control should not be necessary. Acre yields under good management are 35 bushels of corn, 480 pounds of cotton, and 1.8 tons of lespedeza hay.

Pickwick silty clay loam, severely eroded rolling phase (Pr).—This well-drained soil is derived from loess or loesslike silt underlain by old alluvium or from variable mixtures of loess and alluvium.

The old alluvium is from soils underlain by a variety of rocks, but much of the parent material is from soils underlain by limestone. This soil is on 5- to 15-percent slopes on old high terraces along the Tennessee or Buffalo Rivers, chiefly in the Pickwick-Paden-Etowah soil association. It is closely associated with Etowah, Paden, and other Pickwick soils.

Strong acidity, low organic-matter content, and moderate plant-nutrient content and water-holding capacity are characteristic. Roots penetrate all layers with ease, and the soil is well aerated. External drainage is moderately rapid, and internal drainage is moderate. The surface and subsoil layers are relatively gravel-free.

Profile description:

- 0 to 4 inches, yellowish-brown, grayish-brown, or reddish-brown friable silty clay loam, 0 to 6 inches thick.
- 4 to 28 inches, light reddish-brown or yellowish-brown friable silty clay loam, 18 to 24 inches thick.
- 28 inches +, reddish-brown to brownish-red moderately friable silty clay loam splotched with gray and yellow; 2 to 10 feet or more thick.

Most of the original surface layers, and, in places, part of the subsoil have been removed. The plow layer is largely in the subsoil material, so the color and texture of the present surface layer are more like those of the subsoil. Shallow gullies are common, and a few cannot be crossed with heavy farm machinery.

Present use and management.—All of Pickwick silty clay loam, severely eroded rolling phase, has been cleared and used for crops and pasture. Now it is largely idle land or wasteland. Yields are very low on the small acreage planted to cotton and miscellaneous crops. Part of the land is in unimproved pasture. Very few farmers follow good management practices for the purpose of checking erosion and rebuilding the soil.

Use and management requirements.—In productivity, the severely eroded rolling phase of Pickwick silty clay loam is very low, and it is poorly suited to crops requiring intertillage. If used for crops, management should include crop rotation and fertilization. Rotations should be long and consist chiefly of close-growing crops, including deep-rooted legumes.

Lime, phosphate, and possibly nitrogen will be needed to establish a stand of alfalfa or red clover, but sericea lespedeza can be established with little fertilization or advance preparation. After lespedeza is established it should be allowed to remain as long as economically feasible. It is desirable to follow the legume with a small-grain crop. Small grains are close-growing and will aid in controlling erosion; furthermore, the supply of moisture is higher for them than for corn, which matures later. Phosphate is required for high yields of all crops, but the need for potash depends on the crop grown. The legume crop, if it is properly inoculated and fertilized, supplies most of the nitrogen other crops in the rotation need.

Properly constructed terraces speed the rebuilding of productivity by slowing runoff. Terraces increase absorption of water and thereby increase the supply of moisture for growing plants. Contour tillage should be practiced if at all feasible. Crop yields would be low for one or two rotation periods after beginning improved management.

Pickwick silty clay loam, severely eroded hilly phase (Po).—This well-drained soil occurs on highly dissected stream terraces of the Tennessee and Buffalo Rivers. It has developed from parent material consisting of loess or loesslike material underlain by old alluvium or from various mixtures of loess and alluvium. The old mixed alluvium washed partly from upland soils underlain by limestone. Slopes range from 15 to 30 percent. The soil is largely confined to the Pickwick-Paden-Etowah soil association, and areas are closely associated with Etowah and Paden soils.

The soil is strongly acid, low in organic matter, and moderately low in plant nutrients and water-holding capacity. It is very permeable; roots penetrate all layers. External drainage is rapid, and internal drainage is moderate to rapid. The surface soil and subsoil are relatively free of gravel, but the substratum is gravelly in many places.

Profile description :

- 0 to 4 inches, yellowish-brown, grayish-brown, or reddish-brown friable silty clay loam, 0 to 6 inches thick.
- 4 to 24 inches, light reddish-brown or yellowish-brown friable silty clay loam, 12 to 24 inches thick.
- 24 inches +, reddish-brown to brownish-red moderately friable silty clay loam to gravelly clay loam splotted with gray and yellow; 2 to 10 feet or more thick.

Most of the original surface layers and, in places, a part of the subsoil have eroded away. Shallow gullies are common. Most intergully areas still have part of the original surface soil. The surface layer is variable in color and texture because it has been mixed with the subsoil during tillage.

Present use and management.—The severely eroded hilly phase of Pickwick silty clay loam has been cleared and used for crops and pasture. Use and management have not been well adjusted to the physical capability of the soil. Crop yields became progressively lower as the plant-nutrient supply was removed by continuous cropping, as soil was lost to erosion, and as the water-holding capacity was lowered. Most of this soil is now in unimproved pasture or in idle land or wasteland. A small part is cropped, but crop and pasture yields are very low.

Use and management requirements.—As it now is, Pickwick silty clay loam, severely eroded hilly phase, is not suitable for crops and poorly suited to pasture. With good management, however, fair to good pasture could be established and maintained. Improved management would include seeding with a good sod-forming pasture mixture that includes legumes, fertilization, and some means of diverting water.

Lime, phosphate, and possibly nitrogen will be needed to establish and maintain the pasture mixture. Barnyard manure would help greatly in establishing the stand on the most severely eroded spots. Terraces are generally not advisable, but a diversion ditch or terrace to prevent runoff from soils above may be helpful, especially in preventing continued gullyng. If grazing is controlled and proper fertilizer is applied, pasture should improve with age.

Riverwash (R).—Sand bars and beds of gravel that lie adjacent to river channels and beds of chert that lie adjacent to creek channels make up this land type. The land has little agricultural value, as it

is unsuitable for either crops or pasture. The chert beds are a source of road-surfacing material.

Robertsville silt loam (Ra).—This soil has formed from old alluvium washed mainly from upland soils underlain by a wide variety of rocks but partly from soils underlain by limestone. It developed on nearly level to slightly depressed areas under a forest of water-tolerant trees. Areas are confined largely to terraces of the Tennessee River but some are on low terraces along tributary streams. The soil occurs in the Egam-Wolftever-Lindside, Pickwick-Paden-Etowah, and Ennis-Humphreys-Pickwick soil associations. It is closely associated with Wolftever, Taft, Paden, and Egam soils and, on the tributary streams, with Humphreys soils. Some areas are covered by the Kentucky Reservoir.

The soil is very strongly acid and apparently low in organic matter and plant nutrients. The highly mottled gray color of the profile indicates that the water table is high much of the time. The relatively impermeable compact layer greatly retards or almost prohibits passage of water. The surface soil and subsoil are permeable to air, roots, and water in dry periods, when they are not saturated with ground water. The soil is free of gravel in most places, but areas associated with the Humphreys soils contain some water-worn chert. External drainage is slow to very slow.

Profile description :

- 0 to 10 inches, gray mellow silt loam splotted with rust brown; 8 to 12 inches thick.
- 10 to 22 inches, friable silty clay loam highly mottled with gray, yellow, and rust brown; 14 to 18 inches thick.
- 22 to 44 inches (siltpan), compact gray to bluish-gray heavy silty clay splotted with yellow and rust brown; 16 to 24 inches thick.
- 44 inches +, moderately friable silty clay loam mottled with gray and yellow; 2 to 10 feet thick.

Profile characteristics vary. Along small streams the soil is associated with Humphreys soil but differs from it in being lighter textured and in having a weak siltpan. Some areas on low terraces of the Tennessee River have a claypan rather than a siltpan. In many places the thickness of the surface layer is influenced by additions of recent alluvium. These variations and inclusions are poorly drained and do not influence the use of the soil as a whole.

Present use and management.—Robertsville silt loam is mostly wooded with water-tolerant trees—willow oak, willow, cypress, sweetgum, and blackgum. Most of the estimated 40 percent that has been cleared is idle or has a cover of second-growth brush. A few areas are cropped, but yields are variable and low. Because the cropped areas are managed like the associated Wolftever or Paden soils, the management practices are not well adapted to this soil.

Use and management requirements.—Robertsville silt loam is too poorly drained for most common crops. It is fairly well suited to sorghum cane, soybeans, and like crops that can be planted late in spring. Lespedeza does fairly well on areas with fair surface drainage. The soil is best used for pasture although it does not produce much forage. Because it occurs chiefly in long narrow areas surrounded by soils used for crops, this soil is not in areas large enough to be fenced separately. Surface drainage by open ditches would broaden use suitability to some extent and increase the average pro-

ductivity of some forage crops and pasture. Tile drainage is not effective because the compact layer is relatively impermeable. Applications of lime, phosphate, and potash improve pasture, but moisture conditions restrict response to them.

Rough gullied land (Talbott soil material) (Ra).—A close network of gullies characterize this land type. The original surface soil and subsoil layers have been largely removed, but Talbott soils covered most of the areas. The soil material exposed consists chiefly of yellowish-red silty clay, although some remnants of the Talbott soil profile remain. Bedrock has been exposed in many places. Areas are small and occur chiefly in the Talbott-stony land-Lindside soil association. Slopes range from 10 to 30 percent.

Present use and management requirements.—Practically all areas of Rough gullied land (Talbott soil material) are abandoned. A few have been reforested, but most are covered with a sparse growth of cedar and other scrub trees. The soil is unsuited to crops or pasture. In most places it should be reforested, although erosion can usually be checked more quickly with kudzu. Considerable advance preparation such as that discussed in the section on Forests is needed to establish trees.

Sango silt loam (SA).—Areas of this upland soil are readily identified by a 24- to 42-inch chert-free layer over very cherty material. The parent material consists chiefly of wind-blown silt but in most places contains an admixture of cherty limestone residuum. The soil developed under a deciduous forest on 1- to 5-percent slopes. It occurs on broad ridge crests in the cherty limestone hills section and is closely associated with Bodine and Dickson soils.

External drainage is moderate; internal drainage, moderately slow. The water-holding capacity, organic-matter content, and supply of plant nutrients are low. The soil is very strongly acid.

Profile description:

- 0 to 8 inches, gray or yellowish-gray mellow silt loam, 6 to 10 inches thick.
- 8 to 24 inches, brownish-yellow to pale-yellow friable silty clay loam splotted with gray in the lower part; 12 to 20 inches thick.
- 24 to 40 inches (siltpan), compact silty clay loam mottled with gray, yellow and brown; 12 to 20 inches thick.
- 40 inches +, cherty limestone residuum, 10 feet or more thick.

The surface soil and subsoil are free of chert, but a few chert fragments occur in the siltpan in places. The material below the siltpan is very cherty. The upper part of the profile is permeable to air, roots, and water; the siltpan is slightly permeable. Some small slightly or moderately eroded areas are included.

Present use and management.—Most of Sango silt loam is forested with post and blackjack oaks and some hickory and red and white oaks. Timber production is lowered by very slow growth, by cutting the better trees and leaving many unworkable ones in the stand, and by burning and grazing.

Use and management requirements.—Sango silt loam is physically suitable for a wide variety of crops, but its low fertility and low water-holding capacity make it low in productivity. It is suited to a rotation that includes a row crop not oftener than once in 3 or 4 years. A legume should be included, and the intertilled crop should be followed by a cover crop.

Applications of lime, phosphate, and possibly potash are necessary for the legumes; nitrogen is needed for all except the legume and the crop immediately following. Cotton and grain crops respond to a complete fertilizer. If a legume cover crop such as vetch or crimson clover is grown after the intertilled crop, it will protect the soil from erosion and also add nitrogen and organic matter. Corn is frequently injured by droughts because this soil has a low water-holding capacity. Small grains give proportionally higher yields because they mature during the season of higher rainfall. Yields expected under good management are 25 bushels of corn, 340 pounds of cotton, and 1.2 tons of lespedeza hay an acre.

Sequatchie fine sandy loam (Sb).—This sandy soil has formed from alluvium washed from upland soils underlain by a wide variety of rocks, including sandstone, and unconsolidated Coastal Plain sand. Relief is nearly level to undulating (1 to 6 percent). The soil developed under a deciduous forest. It is well drained but is flooded infrequently because it is on low terraces of the Tennessee River. It is in the Egam-Wolftever-Lindside soil association, closely associated with Wolftever, Bruno, Lindside, Huntington, and Egam soils. A part of the acreage is flooded by the Kentucky Reservoir.

The soil is strongly acid and comparatively high in content of organic matter and plant nutrients. It is very permeable to air, roots, and water and moderately high in water-holding capacity. It is relatively free of gravel or stones, but there are some large cobblestones in places.

Profile description:

- 0 to 10 inches, grayish-brown to brown friable fine sandy loam, 8 to 12 inches thick.
- 10 to 30 inches, brown to yellowish-brown friable light clay loam, 18 to 24 inches thick.
- 30 inches +, yellowish-brown to brownish-yellow clay loam spotted with gray and yellow; 2 to 5 feet thick.

Present use and management.—Most of Sequatchie fine sandy loam has been cleared and used for crops. About 40 percent is in corn, 10 percent in cotton, 20 percent in hay, and 10 percent in miscellaneous crops. Some 20 percent of the land is idle. A wide variety of crops are grown but they are not systematically rotated. Row crops are grown 4 or 5 years and on most farms are followed by several years of lespedeza. Until recently, cotton was the only crop fertilized. Now, some lime and phosphate are used in the legume crop. Cotton receives superphosphate or 4-10-4 or a similar mixture at the rate of 200 pounds an acre. About 30 bushels of corn, 360 pounds of cotton, and 1.2 tons of lespedeza hay are average acre yields under ordinary management.

Use and management requirements.—Sequatchie fine sandy loam is one of the most desirable soils in the county for crops. It has excellent tilth, and under good management it is well suited to a wide variety of crops, including red clover and alfalfa. It is relatively high in natural productivity but responds well to good management. Higher yields can be obtained by using crop rotations and fertilizer. The rotation can be moderately short but should include a legume crop. Deep-rooted legumes, as alfalfa, may be grown successfully if they are properly limed and fertilized. Red clover is grown in many places

without fertilization, but lime and phosphate are required for best results. The application of lime and phosphate and the incorporation of organic matter are of primary importance in any improved management program. Under good management, 45 bushels of corn, 520 pounds of cotton, and 2.4 tons of red clover hay are average expectable yields an acre.

Sequatchie fine sandy loam, eroded phase (Sc).—This soil is derived from alluvium washed from soils underlain by a wide variety of rocks. In large part, however, the alluvium is from soils underlain by sandstone and unconsolidated Coastal Plain sand. The soil differs from Sequatchie fine sandy loam in being moderately eroded. It is nearly level to undulating and has 1- to 6-percent slopes. Areas are on low terraces along the Tennessee River and are flooded at infrequent intervals. The soil is in the Egam-Wolftever-Lindside soil association and closely associated with Wolftever, Bruno, Lindside, Huntington, and Egam soils. Some areas are flooded by the Kentucky reservoir.

The soil is strongly acid and moderately high in water-holding capacity and plant-nutrient content. It is very permeable to air, roots, and water and relatively free of gravel and stone.

Profile description:

0 to 6 inches, grayish-brown, brown, or yellowish-brown friable fine sandy loam, 0 to 10 inches thick.

6 to 26 inches, brown to yellowish-brown friable light clay loam, 18 to 24 inches thick.

26 inches +, yellowish-brown to brownish-yellow clay loam spotted with gray and yellow; 2 to 5 feet thick.

Much of the original surface soil, including the thin surface layer of higher organic-matter content, has been removed by erosion. In a few places a part of the subsoil has been mixed with the original surface soil. The present surface layer is variable in thickness and color.

Present use and management.—All of the eroded phase of Sequatchie fine sandy loam has been cleared and used for crops or pasture. About 30 percent is now used for corn, 5 percent for cotton, 25 percent for hay or pasture, and 10 percent for miscellaneous crops. Approximately 30 percent is lying idle. Crops are not systematically rotated; fertilization is not commonly practiced. Cotton is generally fertilized with a light application of a low-analysis fertilizer. Under ordinary management, 25 bushels of corn, 700 pounds of peanuts, 320 pounds of cotton, and 1 ton of lespedeza hay an acre are average yields.

Use and management requirements.—Owing to the loss of organic matter and plant nutrients and the lowering of water-holding capacity through erosion and continuous cropping, Sequatchie fine sandy loam, eroded phase, is somewhat inferior to the uneroded soil for crop production. It is, however, similar in use and management requirements. Rotations should be somewhat longer and include fewer row crops, and heavier fertilization is needed to obtain comparable yields. Since tilth and water-holding capacity have not been seriously impaired, crop yields should not differ greatly from those of Sequatchie fine sandy loam under a high level of management. About 40 bushels of corn, 480 pounds of cotton, 1,000 pounds of peanuts, and 1.2 tons of lespedeza hay an acre are expectable yields under good management.

Stony rolling land (Talbot and Colbert soil materials) (S_r).—From one-third to two-thirds of this land type is covered by limestone bedrock outcrops that prevent its use as cropland. Areas are chiefly in the southwestern part of the county in the Talbot-stony land-Lindside soil association. Slopes range from 5 to 15 percent. This land type is associated chiefly with Talbot, Maury, Inman, Emory, and Lindside soils. It is underlain by limestone. The spaces between outcrops are filled with heavy-textured soil material ranging from a few inches to 3 feet thick. This material has properties similar to those of the Talbot or Colbert soils. It is a yellow or red silty clay loam to silty clay. In addition to bedrock outcrops, loose chert and limestone fragments are scattered over the land in many places.

Present use and management.—Most of Stony rolling land (Talbot and Colbert soil materials) is in cedar forest, but some of the growth is predominantly deciduous. The forest has been cut over a number of times, and the stand is now sparse and small.

Use and management requirements.—Stony rolling land (Talbot and Colbert soil materials) is not suitable for crops and very poor for pasture. It is best suited to forest.

Stony hilly land (Talbot and Colbert soil materials) (S_h).—Characteristic of this land type are many limestone outcrops that prevent its use for crops (pl. 8, 4). One-third to two-thirds of its surface is limestone bedrock outcrops. The spaces between the outcrops are filled with heavy-textured soil material ranging from a few inches to 2 or 3 feet thick. This material—a yellowish or reddish silty clay loam to silty clay—has properties similar to those of the Talbot or Colbert soils. In addition to bedrock outcrops, loose chert and limestone fragments are scattered over the land in many places. A narrow outcrop of black shale is included.

This land occurs in the upland areas underlain by massive limestone and shale. It occurs chiefly in the southwestern part of the county in the Talbot-stony land-Lindside soil association, but some areas are in uplands adjacent to the Buffalo River. Slopes range from 15 to 30 percent. The land occupies lower ridge slopes in association with Talbot, Bodine, Emory, and Lindside soils.

Present use and management.—Stony hilly land (Talbot and Colbert soil materials) is mostly in forest. There are some deciduous trees but the growth is chiefly cedar. The forest has been cut over a number of times, and consequently the stand is now sparse and small.

Use and management requirements.—Stony hilly land (Talbot and Colbert soil materials) is not suitable for crops and very poor for pasture. A few of the less stony areas could be pastured, but most of the land is best used for forest.

Stony rough land (Talbot and Colbert soil materials) (S_f).—Numerous limestone outcrops prevent use of this land for crops. From one-third to three-fourths of the surface is covered by outcrops of limestone or shale bedrock. Spaces between outcrops are filled with heavy-textured soil material ranging from a few inches to 2 to 3 feet thick. This soil material has properties similar to those of Talbot or Colbert soils. It is yellowish or reddish silty clay loam to silty clay. Loose chert and limestone fragments, in addition to bedrock outcrops, are on the land in many places.

This land occurs chiefly in the southwestern part of the county on uplands underlain by massive limestone and shale. It occupies 30- to 60-percent slopes in the Talbott-stony land-Lindside soil association, and a considerable acreage is on upland slopes adjacent to the Buffalo River and some of its tributaries. The Talbott, Emory, Lindside, and Dandridge are associated soils.

Present use and management.—Most of Stony rough land (Talbott and Colbert soil materials) is in cedar forest that has been cut over many times; consequently the stand is now sparse and the trees small.

Use and management requirements.—Stony rough land (Talbott and Colbert soil materials) is not suitable for crops or pasture. On most farms it is best used for forest.

Taft silt loam (TA).—This soil of the terrace lands has formed from old alluvium washed from upland soils underlain by a wide variety of rocks, limestone apparently predominating. On high terraces the alluvium is covered with a thin loess or loesslike silt layer. Relief is nearly level to gently sloping (1 to 3 percent). The natural vegetation is deciduous forest with high proportion of water-tolerant trees. Most of the soil is on low terraces of the Tennessee River in the Egam-Wolftever-Lindside soil association, although some areas are on low terraces along practically all the larger streams of the county and others are on high terraces in the Pickwick-Paden-Etowah soil association. The Wolftever, Robertsville, Pickwick, Paden, Humphreys, Lindside, and Melvin are closely associated soils. Some of the acreage is covered by the Kentucky Reservoir.

The soil is strongly to very strongly acid. Organic-matter content, plant-nutrient content, and water-holding capacity are low. External drainage is very slow to moderate, and internal drainage is slow. The surface soil and subsoil are permeable, but the siltpan is relatively impermeable. The water table is at or near the surface in rainy seasons, especially during winter and early spring. Most places are free of stones or gravel, but a considerable quantity of water-worn chert occurs throughout the profile along streams in the cherty limestone hills section. In many places the subsoil and siltpan contain numerous concretions.

Profile description :

- 0 to 8 inches, gray to yellowish-gray mellow silt loam, 6 to 12 inches thick.
- 8 to 22 inches, pale-yellow friable silty clay loam splotched with gray below about 15 inches; 10 to 16 inches thick.
- 22 to 42 inches (siltpan), very compact silty clay loam highly mottled with gray, yellow, and brown; 16 to 24 inches thick.
- 42 inches +, yellowish-brown heavy silty clay loam splotched with yellow and gray; 2 to 10 feet thick.

Profile characteristics vary considerably. On many of the low Tennessee River terraces the surface soil is brownish-gray and the profile is heavier throughout. On the low terraces of the small streams, considerable gravel may be in the profile and the siltpan is missing or only weakly developed. In use and management requirements these variations do not differ significantly from the soil as it typically occurs.

Present use and management.—Taft silt loam is ordinarily used and managed like the adjoining Paden or Wolftever soils. A larger part is in forest, and probably a slightly larger part is idle. The forest



A, Numerous limestone outcrops on stony hilly land (Talbott and Colbert soil materials).

B, Talbott stony silty clay loam, eroded rolling phase, on the right center, showing bedrock outcrops that interfere with tillage.



A, One of the larger valleys in the Bodine-Ennis-Humphreys soil association.
B, Burned-over forest.

consists of sweetgum, blackgum, beech, ash, hickory, and willow oak. Crop failures are more common than on the adjacent better-drained soils, and average yields are considerably less. For the areas large enough to be farmed as a unit, lespedeza, soybeans, sorghum, and like more water-tolerant crops are usually selected. Under the prevailing system of management average yield are 15 bushels of corn and 0.6 ton of lespedeza hay an acre.

Use and management requirements.—The use suitability of Taft silt loam is limited by imperfect drainage. Corn, soybeans, lespedeza, white and alsike clovers, and redtop are among the crops that grow successfully. In many places surface drainage can be improved and use suitability broadened by digging open ditches. Tile drains ordinarily are not practical. The soil is suited to short crop rotations but can be used to good advantage in long rotations because only a limited variety of crops can be grown on it.

The content of lime and of most plant nutrients is low; management is concerned with supplying these elements as cheaply and effectively as possible. Nitrogen can best be supplied by growing a legume in the rotation, and by following intertilled crops with a legume cover crop to be turned under. Lime, phosphate, and possibly potash are needed for best results from the legume crop. All crops respond to phosphate fertilizers. The need for potash depends on the crop grown and previous treatment the soil has received. Acre yields of 25 bushels of corn and 1.2 tons of lespedeza hay are expected under good management.

Talbott silt loam, rolling phase (Tb).—The parent material of this well-drained upland soil is residuum of clayey limestone. The forest cover, although predominantly deciduous, contains many cedar trees. The areas—widely distributed throughout the southwestern part of the county—are largely confined to the Talbott-stony land-Lindside soil association and are closely associated with the stony land types and with Maury, Inman, Bodine, Emory, and Lindside soils. Slopes range from 5 to 15 percent. In reaction the soil is medium to strongly acid. Its content of plant nutrients and organic matter is moderately high. External drainage is moderate, and internal drainage is moderately slow. Small flaggy slabs of limestone are on the surface, and bedrock outcrops in some places. Clayey limestone bedrock is at a depth of 3 to 5 feet in most places, but the rock floor is uneven and the rock may be as much as 10 feet below the surface. Loose chert has rolled onto this soil from the higher lying Bodine soils in many places.

Profile characteristics:

- 0 to 8 inches, grayish-brown friable silt loam to silty clay loam, 6 to 10 inches thick.
- 8 to 24 inches, yellowish-red to reddish-yellow strongly plastic silty clay of well-developed medium nutlike structure; 12 to 24 inches thick.
- 24 inches +, reddish-yellow very strongly plastic silty clay spotted with gray and yellow; bedrock at 3 to 5 feet.

The subsoil varies from reddish yellow to dark red or almost purple. The purplish color is inherited from the purple parent rock. In many places the parent material has been influenced to a considerable extent by a small admixture of loess. Because of this admixture the surface layer is lighter in color and texture and the upper part of the subsoil is

more friable and more permeable. A few small included areas are slightly eroded, and some have 2- to 5-percent slopes.

Present use and management.—Forest, chiefly of red and white oaks, cedar, and hickory, covers most of Talbott silt loam, rolling phase. Most stands have been cut over and are now small and include many cull trees. Timber makes moderately rapid growth and is of good quality.

Use and management requirements.—Talbott silt loam, rolling phase, is suited to crops and pasture but on many farms clearing and using it for these purposes would not be practical, for it occurs in small areas associated with stony land types. It is fairly well suited to corn, lespedeza, cotton, and most other common field crops and well suited to alfalfa, sweetclover, and red clover. If the soil is cleared, management will be concerned with improving tilth and moisture conditions, preventing erosion, and increasing the supply of organic matter, nitrogen, lime, phosphorus, and potash. Use and management practices will be similar to those for Talbott silty clay loam, eroded rolling phase.

Talbott silty clay loam, eroded rolling phase (Tb).—Residuum of clayey limestone is the material from which this upland soil developed. Development took place under a deciduous forest cover that included some cedar trees. Slopes range from 5 to 15 percent. The areas are widely distributed throughout the southwestern part of the county but are confined chiefly to the Talbott-stony land-Lindside soil association. They are closely associated with the stony land types and with Maury, Inman, Bodine, and other Talbott soils.

This soil is medium to strongly acid. It is moderately low in organic matter and moderate in content of most plant nutrients. External drainage is moderate to moderately rapid; internal drainage is moderately slow. Some small flaggy slabs of limestone are on the surface, and scattered outcrops of bedrock are common. The depth to bedrock is variable but averages about 5 feet. Loose chert fragments are on the surface of many areas that lie on slopes below Bodine soils.

Profile description:

- 0 to 6 inches, grayish-brown to reddish-yellow moderately friable silty clay loam, 0 to 8 inches thick.
- 6 to 22 inches, yellowish-red to reddish-yellow strongly plastic silty clay of well-developed medium nut structure; 12 to 24 inches thick.
- 22 inches +, reddish-yellow very strongly plastic silty clay splotted with gray and yellow; bedrock at 3 to 5 feet in most places.

A considerable part of the original surface soil has been eroded away. The subsoil has mixed with remnants of the original surface soil during tillage, and as a result the present surface layer is heavier in texture and variable in color. Small severely eroded spots that have lost all the surface soil are common. Many of the soils included have a dark-red and purplish subsoil, but they do not differ significantly in other characteristics. Some included soils, derived from parent material containing a small admixture of loess, are more friable and more permeable. A few small areas have 2- to 5-percent slopes.

Present use and management.—The greater part of Talbott silty clay loam, eroded rolling phase, is cropped, but a considerable part is idle, and a small acreage is pastured. Corn, cotton, and lespedeza

are the principal crops, but cowpeas, sweetpotatoes, and peanuts are grown to a limited extent. About 20 percent of the land is in corn, 5 percent in cotton, 15 percent in miscellaneous crops, and 30 percent in hay and pasture. Approximately 30 percent is idle land or wasteland. Crops are not systematically rotated. Small quantities of fertilizer are used on cotton, and recently some lime and phosphate have been applied for hay crops. Under ordinary management, 20 bushels of corn, 220 pounds of cotton, and 0.9 ton of lespedeza hay an acre are average yields.

Use and management requirements.—Tightness and slow permeability of the subsoil greatly limit crop production on the eroded rolling phase of Talbott silty clay loam. The subsoil inhibits absorption and percolation of water and retards movement of moisture; consequently, the surface soil tends to be extremely wet or dry and crops are severely injured in both wet and dry periods. Restricted water absorption naturally increases runoff, particularly during heavy rainfall, and accounts for the erodibility of the soil.

This soil is probably best suited to hay and pasture crops, but under careful soil management it can be conserved under a rotation that includes intertilled crops once in 5 or 6 years. All the common crops of the county, including alfalfa, sweetclover, and red clover, are grown with success.

Management requirements are exacting. The high susceptibility of the soil to erosion requires that the rotation be long and include close-growing crops, especially grasses and legumes, a large part of the time. This is also necessary to maintain fairly good tilth. Deep-rooted crops, such as alfalfa, sericea lespedeza, or sweetclover, grown periodically should improve the permeability of the subsoil. Cultivation should be avoided when the soil is very wet or dry. Tillage should be on the contour, but if this is not practical, the rotation should be longer. Terracing and such engineering measures may help to control runoff and erosion, but considering the unfavorable consistence of the subsoil, the practicability of constructing terraces and maintaining them for a long period of years is doubtful. Cover crops should be kept on the soil during winter.

Fertilizer is required for continued high yields of most crops. Lime, phosphate, and possibly potash are required for the deep-rooted legumes. Phosphate is needed for all crops, and nitrogen for all except legumes and those crops immediately following them. Yields an acre under good management practices are 30 bushels of corn, 360 pounds of cotton, and 1.4 tons of lespedeza hay.

Talbott silty clay loam, severely eroded rolling phase (T_ε).—This upland soil developed from the residuum of clayey limestone on 5- to 15-percent slopes. It is widely distributed throughout the southwestern part of the county, and some areas are in the uplands along the Buffalo River. It is largely confined to the Talbott-stony land-Lindside soil association and is closely associated with the stony land types and with Maury, Bodine, and other Talbott soils.

The soil is strongly acid, low in organic matter, and moderately low in many plant nutrients. External drainage is moderately rapid; internal drainage is moderately slow. Some flaggy limestone fragments and loose chert are on the surface in many places. An occasional bedrock outcrop occurs.

Profile description:

0 to 4 inches, grayish-brown, reddish-yellow, or yellowish-red plastic silty clay loam, 0 to 6 inches thick.

4 to 20 inches, yellowish-red to reddish-yellow strongly plastic silty clay of well developed medium nut structure; 12 to 24 inches thick.

20 inches +, reddish-yellow very strongly plastic silty clay spotted with gray and yellow; bedrock at depths of 3 to 5 feet in most places.

In many places most of the original surface layer and part of the subsoil are missing as a result of erosion. The present plow layer consists largely of subsoil material. Shallow gullies are common. Some of the original surface soil remains on the areas between gullies.

Present use and management.—All of the severely eroded rolling phase of Talbott silty clay loam has been used for crops, including row crops, but the greater part is now idle. Some land, however, is still used for crops or pasture. Crop yields are generally low. The present eroded condition indicates that use and management were not adjusted to the physical limitations of this soil.

Use and management requirements.—Chiefly because it is more eroded, Talbott silty clay loam, severely eroded rolling phase, is much inferior to the other Talbott silty clay loam and silt loam soils for crop production. Tilth is unfavorable, susceptibility to puddling and clodding is high, and the range in moisture content suitable for safe tillage is narrow.

A hard crust tends to form on the surface when the soil dries after heavy rains. Plants must push up through the hard crust, and it is therefore difficult to establish alfalfa, red clover, and many other crops. When the soil becomes very dry it is generally very hard and cloddy and has deep cracks as much as half an inch wide. Most of the original surface soil, which has a fairly high water-absorption capacity, has been lost. The heavy subsoil now at the surface retards the downward penetration of roots and greatly increases runoff, especially after heavy rains. Owing to these conditions, effective control of runoff and erosion is difficult.

In its present condition this soil is better suited to pasture or permanent hay than to tilled crops. It seems likely, however, that after an extended period in hay or pasture, the soil would again become suitable for cultivated crops if it were well managed. Deep-rooted plants, such as alfalfa and sweetclover, and grasses or other fibrous-rooted plants should be especially beneficial because the roots have a favorable effect upon the physical condition of the soil. Lime, phosphate, and possibly potash are needed to establish and maintain good pasture. A good sod-forming pasture mixture that includes legumes should be used. Grazing should be carefully controlled, especially when moisture conditions are adverse.

Talbott silty clay loam, eroded hilly phase (Tc).—The parent material of this soil is residuum of clayey limestone. The soil differs from Talbott silt loam, rolling phase, in being eroded and in having steeper slopes of 15 to 30 percent. The areas are widely distributed throughout the southwestern part of the county, chiefly in association with Bodine, Maury, and other Talbott soils.

The soil is medium to strongly acid. Organic-matter content is moderately low, and the content of plant nutrients is medium. External drainage is rapid; internal drainage, moderately slow. Small

flaggy limestone fragments and loose chert are on the surface in many places. An occasional bedrock outcrop occurs.

Profile description:

0 to 6 inches, grayish-brown to reddish-yellow moderately friable silty clay loam, 0 to 8 inches thick.

6 to 22 inches, yellowish-red to reddish-yellow strongly plastic silty clay, 12 to 24 inches thick.

22 inches +, reddish-yellow very strongly plastic silty clay spotted with gray and yellow; bedrock at depths of 2' to 5 feet.

A considerable part of the original surface soil has been lost through erosion. The mixing of the subsoil with the remnants of the original surface soil resulted in a surface layer heavier in texture and variable in color. Small severely eroded spots that have lost all the surface soil are common. A small included acreage is uneroded.

Present use and management.—Most of the eroded hilly phase of Talbott silty clay loam has been cleared and used for crops or pasture. In most places it is cleared and cultivated only a few years and then abandoned or used for unimproved pasture. About 40 percent is idle land or wasteland, 10 percent is used for corn, 40 percent for hay or pasture, and 10 percent for miscellaneous crops. Crop and pasture yields are low.

Use and management requirements.—Talbott silty clay loam, eroded hilly phase, is very poor for crops requiring tillage because of its strong slopes, erosion, and susceptibility to further erosion. On most farms it is probably best used for pasture or semipermanent hay crops. Lime, phosphate, and possibly potash are needed in most places to establish the good pasture sod necessary to control erosion. Nitrogen may be needed to establish the stand, but once it is established, the legumes in the mixture should supply adequate nitrogen. A sod-forming pasture mixture that includes legumes should be seeded. Grazing should be carefully controlled so as to maintain a good sod at all times.

Talbott stony silty clay loam, rolling phase (TL).—This upland soil has developed from residuum of clayey limestone. It is characterized by bedrock outcrops or loose chert and limestone fragments in quantities sufficient to interfere with cultivation. From Talbott silt loam, rolling phase, it differs chiefly in having more bedrock outcrops, underlying bedrock nearer the surface, and generally thinner surface soil and subsoil layers. Areas are widely distributed on 5- to 15-percent slopes in the southern and southwestern parts of the county, largely in the Talbott-stony land-Lindside soil association. A considerable areage, however, is on uplands adjacent to the Buffalo River. The stony land types and the Bodine, Maury, and other Talbott soils are closely associated.

The soil is medium to strongly acid, moderately high in content of organic matter and plant nutrients, and moderately low in water-holding capacity. External drainage is moderate; internal drainage is moderately slow.

Profile description:

0 to 8 inches, grayish-brown friable silt loam to silty clay loam, 4 to 10 inches thick.

8 to 24 inches, yellowish-red to reddish-yellow strongly to very strongly plastic silty clay, 8 to 24 inches thick.

24 inches +, reddish-yellow very strongly plastic silty clay splotted with gray and yellow; bedrock at a depth of 2 to 4 feet in most places, but the depth to bedrock is extremely variable.

Present use and management.—Most of Talbott stony silty clay loam, rolling phase, is in cedar forest that includes many white and red oaks, hickory, and other deciduous trees. Much of the forest has been cut over recently; the stand is now small and includes many cull trees. Timber growth is moderately rapid.

Use and management requirements.—Talbott stony silty clay loam, rolling phase, is suited to crops and pasture but it occurs in small areas associated with stony land types and therefore it is not economically feasible to clear and cultivate it on many farms. In use suitability and management requirements this soil is similar to Talbott silt loam, rolling phase, but its stoniness makes it less desirable for either crops or pasture and its lower water-holding capacity makes crops more subject to injury from droughts. The stones occupying a considerable part of the land surface interfere with tillage and with weed eradication in pastures.

Talbott stony silty clay loam, eroded rolling phase (Tg).—Development of this soil has been from the residuum of clayey limestone. The soil is relatively shallow, and bedrock outcrops are common (pl. 8, B). The native vegetation was predominantly cedar but included many deciduous trees. Slopes range from 5 to 15 percent. The soil is widely distributed throughout the southwestern part of the county and in uplands adjacent to the Buffalo River. Most of it is in the Talbott-stony land-Lindside soil association.

In reaction the soil is strongly acid. Its content of organic matter and most plant nutrients is medium. External drainage is moderate to moderately rapid, but internal drainage is moderately slow. Small flaggy limestone and chert fragments are on the surface in many places, and bedrock outcrops are sufficiently numerous to interfere with cultivation.

Profile characteristics:

0 to 6 inches, grayish-brown to reddish-yellow moderately friable silty clay loam, 0 to 8 inches thick.

6 to 22 inches, yellowish-red to reddish-yellow strongly to very strongly plastic silty clay, 8 to 24 inches thick.

22 inches +, reddish-yellow very strongly plastic silty clay splotted with gray and yellow; bedrock at depths of 2 to 4 feet in most places.

The present surface layer is a mixture of remnants of the original surface soil, a considerable part of which has been lost by erosion, and the upper part of the subsoil. This layer is more variable in color than the original surface soil, and its texture is heavier in most places. Small severely eroded spots exposing the subsoil are common and conspicuous. Some severely eroded areas that have lost most of their surface layers are included.

Present use and management.—All of the eroded rolling phase of Talbott stony silty clay loam has been cleared and at some time used for crops or pasture. Only about 30 to 50 percent is now used for those purposes; the rest is idle land or wasteland. Yields of the common crops—corn, cotton, and lespedeza—are generally low, but some fair to good pasture has been established.

Use and management requirements.—On most farms Talbott stony silty clay loam, eroded rolling phase, is best used and managed for

pasture. It should be seeded to a permanent sod-forming pasture mixture and fertilized with lime, phosphate, and nitrogen. After the pasture is established, the legumes in the pasture mixture should supply adequate quantities of nitrogen if they are properly fertilized. Grazing should be carefully controlled to maintain a good sod and to aid in keeping down weeds. If this soil is used for crops, management practices will be similar to those for Talbott silty clay loam, eroded rolling phase.

Talbott stony silty clay loam, hilly phase (Tx).—This upland soil has developed from the residuum of clayey limestone. It differs from Talbott silt loam, rolling phase, chiefly in being more stony and having steeper slopes. Bedrock outcrops and loose stones are numerous enough to interfere with cultivation. Slopes range from 15 to 30 percent. The forest cover is predominantly cedar in most places. Relatively large areas are widely distributed throughout the southwestern part of the county and in the uplands adjacent to the Buffalo River. In most places, the soil is on lower ridge slopes below cherty Bodine soils.

This soil is medium to strongly acid, moderately high in organic-matter and plant-nutrient content, and moderately low in water-holding capacity. External drainage is rapid, but internal drainage is moderately slow. The chert scattered on the surface has drifted from the higher lying Bodine soils.

Profile description:

- 0 to 8 inches, grayish-brown friable silt loam to silty clay loam, 4 to 10 inches thick.
- 8 to 24 inches, yellowish-red to reddish-yellow strongly to very strongly plastic silty clay, 8 to 20 inches thick.
- 24 inches +, reddish-yellow very strongly plastic silty clay spotted with gray and yellow; bedrock at 2 to 4 feet in most places, but depth to bedrock is variable.

Present use and management.—The hilly phase of Talbott stony silty clay loam is mostly in forest of cedar, white and red oaks, and hickory. Most of the timber has been cut over a number of times, and the stand is now small and includes many cull trees. The trees grow moderately rapidly.

Use and management requirements.—Owing to stoniness, strong slopes, and susceptibility to erosion, Talbott stony silty clay loam, hilly phase, is generally considered unsuitable for crops but suitable for pasture. The areas lying on lower ridge slopes below cherty Bodine soils are less well suited to pasture than the rest, because runoff from the upper slopes makes erosion more difficult to control, and in addition, considerable chert drifts down from the soil above. Pasture management is similar to that for Talbott silty clay loam, eroded hilly phase.

Talbott stony silty clay loam, eroded hilly phase (Tr).—Like the hilly phase, this stony well-drained soil developed from clayey limestone residuum. It occupies 15- to 30-percent slopes in areas throughout the southwestern part of the county and in the uplands adjacent to the Buffalo River. It is largely confined to the Talbott-stony land-Lindside soil association. Native forest cover consisted of cedar, white and red oaks, and hickory.

The soil is strongly acid, moderately low in organic matter, and medium in content of plant nutrients. External drainage is rapid,

but internal drainage is moderately slow. The water-holding capacity is moderately low. Depth to bedrock is variable, and bedrock outcrops are common. Loose limestone and chert fragments are on the surface in many places.

Profile characteristics:

- 0 to 6 inches, grayish-brown to reddish-yellow moderately friable silty clay loam, 0 to 8 inches thick.
- 6 to 22 inches, yellowish-red to reddish-yellow strongly to very strongly plastic silty clay, 8 to 20 inches thick.
- 22 inches +, reddish-yellow very strongly plastic silty clay splotted with gray and yellow; bedrock at 2 to 4 feet in most places.

A substantial part of the original surface soil has been lost as a result of accelerated erosion. The mixing of the upper part of the subsoil with the remnants of the original surface soil has caused the present surface layer to be heavier in texture and variable in color. Small severely eroded spots are common.

Present use and management.—All of the eroded hilly phase of Talbott stony silty clay loam has at one time been cleared and used for crops and pasture. Part is still used for these purposes, but yields are very low. Most of the acreage is now idle land or wasteland.

Use and management requirements.—Talbott stony silty clay loam, eroded hilly phase, owing to susceptibility to further erosion, strong slopes, stoniness, and poor tilth, is not suitable for crops on most farms. It is now unproductive of pasture plants, but indications are that fair to good pasture can be established and maintained. Lime, phosphate, and probably nitrogen and potash will be needed, as well as a good sod-forming pasture mixture that includes legumes. Pasture management should be similar to that for Talbott silty clay loam, eroded hilly phase.

Talbott stony silty clay loam, severely eroded hilly phase (T_M).—This upland soil is characterized by many bedrock outcrops. It developed from clayey limestone residuum on slopes of 15 to 30 percent. Areas are largely confined to the Talbott-stony land-Lindside soil association in the southwestern part of the county.

In reaction the soil is strongly acid. It is low in content of organic matter, in supply of plant nutrients, and in water-holding capacity. External drainage is rapid to very rapid, and internal drainage is moderately slow.

Profile description:

- 0 to 4 inches, grayish-brown, reddish-yellow, or yellowish-red moderately plastic silty clay loam, 0 to 6 inches thick.
- 4 to 20 inches, yellowish-red to reddish-yellow strongly to very strongly plastic silty clay, 8 to 20 inches thick.
- 20 inches +, reddish-yellow very strongly plastic silty clay splotted with gray and yellow; bedrock at 2 to 4 feet in most places.

Most of the original surface layer and in places part of the subsoil have been lost through erosion. Small shallow gullies are common; many of the intergully areas still retain a part of the original surface layer. The plow layer consists largely of subsoil material.

Present use and management.—All of the severely eroded hilly phase of Talbott stony silty clay loam has been cleared and used for crops, but most of it is now in idle land or wasteland. Yields are very low on the small part used for pasture.

Use and management requirements.—Talbot stony silty clay loam, severely eroded hilly phase, is very poorly suited to either crops or pasture. It is difficult to till because of stoniness and strong slopes. In its present condition it is probably best used for forest on most farms. For a discussion of reforestation, see the section on Forests.

Talbot stony silty clay loam, steep phase (T_N).—Slopes of this upland soil are greater than 30 percent. The soil has developed from clayey limestone residuum and is characterized by bedrock outcrops. It differs from the hilly phase in having a steeper slope and in being more variable in depth to bedrock, stoniness, and development of surface soil and subsoil layers. Development took place under a forest cover of cedar, red and white oaks, and hickory. Areas are widely distributed throughout the southwestern part of the county and in the uplands adjacent to the Buffalo River. The areas are largely confined to the Talbot-stony land-Lindside soil association.

This soil is medium to strongly acid and moderately high in organic matter and plant nutrients. External drainage is very rapid, but internal drainage is moderately slow.

Profile characteristics:

0 to 6 inches, grayish-brown friable silt loam to silty clay loam, 4 to 10 inches thick.

6 to 22 inches, yellowish-red to reddish-yellow strongly to very strongly plastic silty clay, 8 to 20 inches thick.

22 inches +, reddish-yellow very strongly plastic silty clay spotted with gray and yellow; bedrock at 2 to 4 feet in most places.

The depth to bedrock is variable, and bedrock outcrops are common. Limestone and chert fragments are on the surface in many places.

Present use and management.—The steep phase of Talbot stony silty clay loam is mostly in forest of cedar, white and red oaks, and hickory. Most of the timber has been cut over, and the present stand is small. Tree growth is moderately rapid.

Use and management requirements.—Owing to steepness, stoniness, and extreme susceptibility to erosion, Talbot stony silty clay loam, steep phase, is generally considered not suitable for crops or pasture. On most farms, forest is probably its best use. For a discussion of forest management, see the section on Forests.

Talbot stony silty clay loam, eroded steep phase (T_H).—This relatively shallow upland soil has developed from clayey limestone residuum. It is characterized by bedrock outcrops and differs from the steep phase in being moderately eroded. Slopes range from 30 to 50 percent. The soil is widely distributed throughout the southwestern part of the county and in uplands along the Buffalo River. The stony land types and Bodine, Inman, Maury, and other Talbot soils are closely associated.

This phase is strongly acid. It is moderately low in organic-matter content and water-holding capacity and medium in content of plant nutrients. External drainage is very rapid, but internal drainage is moderately slow.

Profile description:

0 to 4 inches, grayish-brown to reddish-yellow moderately friable silty clay loam, 0 to 8 inches thick.

4 to 20 inches, yellowish-red to reddish-yellow strongly to very strongly plastic silty clay, 8 to 20 inches thick.

20 inches +, reddish-yellow very strongly plastic silty clay spotted with gray and yellow; bedrock at 2 to 4 feet in most places.

A substantial part of the original surface soil has been lost as a result of erosion. The mixing of the subsoil with remnants of the surface soil has caused the present surface layer to be heavier in texture and highly variable in color. Some severely eroded areas are included that have lost most of the surface layer and, in places, part of the subsoil. The depth to bedrock is variable. Some limestone and chert fragments are on the surface in many places.

Present use and management.—All of the eroded steep phase of Talbott stony silty clay loam has been cleared and used for crops and pasture. Most areas are now idle or in unimproved pasture that produces very low yields.

Use and management requirements.—Steepness, stoniness, erosion, and extreme susceptibility to erosion, make Talbott stony silty clay loam, eroded steep phase, generally unsuitable for crops or pasture. If used for pasture, the management will be similar to that for the eroded hilly phase. On most farms, however, the soil is probably best used for forest. For a discussion of reforestation, see the section on Forests.

Wolftever silt loam (W_A).—This soil has formed from old mixed alluvium washed from upland soils underlain by a wide variety of rocks, limestone apparently predominating. It developed on 1- to 6-percent slopes under a deciduous forest vegetation. Fairly large areas are on low Tennessee River terraces or on tributary streams influenced by backwater from the river. They are confined to the Egam-Wolftever-Lindside soil association, and some are covered by the Kentucky Reservoir.

Reaction is strongly acid. Organic-matter and plant-nutrient contents are moderately high, and water-holding capacity is moderately low. Drainage, both internal and external, is moderately slow. The compact subsoil retards movement of air and water and restricts root penetration.

Profile description:

0 to 10 inches, brownish-gray to grayish-brown friable silt loam, 8 to 12 inches thick.

10 to 32 inches, yellowish-brown to brownish-yellow slightly compact to compact heavy silty clay loam, 15 to 25 inches thick.

32 inches +, brownish-yellow moderately friable silty clay loam spotted with gray and yellow; 2 to 10 feet thick.

This soil varies considerably in age and degree of profile development. The young broad nearly level areas are heavier in texture, have a more compact subsoil, and are lower in productivity than the soil described. Crops are frequently damaged by droughts on this variation. Those areas on the older terraces are overflowed only at long intervals, have a surface soil more highly leached and lighter in color and texture, and have a subsoil lighter in color and texture and more friable. A weakly developed siltpan has formed in many places. This old-terrace variation approaches the Paden soils in age and profile characteristics.

Present use and management.—About 50 percent of Wolftever silt loam is forested. Corn, cotton, and lespedeza are the principal crops grown on the cleared land. The soil is used like Sequatchie fine sandy

loam, but a larger part is idle each year. Crops are not rotated to maintain or increase crop yields but are grown according to the needs of the farmer. Fertilization is commonly practiced only for cotton, which receives about 200 pounds of superphosphate or a 4-10-4 mixture. Recently, some lime and phosphate have been used on lespedeza. Under ordinary management, 25 bushels of corn, 280 pounds of cotton, 700 pounds of peanuts, and 1 ton of lespedeza hay an acre are average yields.

Use and management requirements.—Wolftever silt loam is suitable for crops and moderately high in fertility, but yields are only moderate because of the compact subsoil and low water-holding capacity. Yields vary greatly, depending on the quantity and distribution of rainfall. Susceptibility to flooding limits use to some extent. Winter annuals and perennial or biennial crops are not commonly grown, but infrequent loss of these crops should not prohibit their use.

Because this soil has an unfavorable consistence in its subsoil and substratum, it may be more difficult to increase productivity than on the associated Sequatchie soils. Fertilization and systematic crop rotations, however, give considerable response. The rotation can be moderately short but should include a legume, preferably a deep-rooted one. Lime and phosphate are needed for best results with the legume crop; nitrogen is required for all except the legume and the crop immediately following. The need for potash depends on the crop to be grown and the previous treatment of the soil. Cotton requires potash in most places.

The supply of organic matter should be maintained or increased by green-manure crops or applications of barnyard manure. Grasses with fibrous root systems tend to increase the supply of organic matter and improve tilth. Expected acre yields under good management are 35 bushels of corn, 480 pounds of cotton, 900 pounds of peanuts, and 1.5 tons of lespedeza hay.

Wolftever silty clay loam, eroded phase (W_B).—The material from which this soil developed is old mixed alluvium washed from upland soils underlain by a wide variety of rocks, limestone predominating. Areas have 1- to 6-percent slopes and occur on low Tennessee River terraces or on tributary streams influenced by backwater from the river. They are confined to the Egam-Wolftever-Lindside soil association. Some of the acreage is covered by the Kentucky Reservoir.

The soil is strongly acid, moderately well supplied with organic matter and plant nutrients, and moderately low in water-holding capacity. Drainage, both external and internal, is moderately slow. The compact subsoil retards movement of air and water and restricts root penetration.

Profile description :

- 0 to 6 inches, grayish-brown, light-brown, or yellowish-brown friable silty clay loam or silt loam, 0 to 8 inches thick.
- 6 to 28 inches, yellowish-brown to brownish-yellow slightly compact to compact heavy silty clay loam, 15 to 25 inches thick.
- 28 inches +, brownish-yellow moderately friable silty clay loam spotted with gray and yellow; 2 to 10 feet thick.

A considerable part of the original surface soil, including the thin surface layer of higher organic-matter content, has been eroded away.

In many places a small part of the subsoil has been mixed with the remaining surface soil. This mixing of surface soil and subsoil in the plow layer has resulted in a heavier textured surface soil. Included are a few small severely eroded areas that are conspicuous because so much of the subsoil is exposed.

Present use and management.—All of the eroded phase of Wolftever silty clay loam has been cleared and used as cropland—30 percent is in corn, 5 percent in cotton, 5 percent in peanuts, 25 percent in lespedeza, 15 percent in miscellaneous crops, and 20 percent in idle cropland. Crops are not rotated systematically, nor is fertilization commonly practiced. Cotton usually receives a light application of a complete fertilizer, and some farmers use lime and phosphate on lespedeza. Crop yields are decidedly less than on the slightly eroded or uneroded Wolftever soils. Acre yields of 18 bushels of corn, 240 pounds of cotton, 600 pounds of peanuts, and 0.8 ton of lespedeza hay are obtained under ordinary management practices.

Use and management requirements.—The tilth properties of Wolftever silty clay loam, eroded phase, have been injured by erosion. Fertility is lower and available moisture supply is considerably less than for the uneroded soil. The soil tends to bake or become hard and crusted on top; therefore less rainfall is absorbed and crops are subject to more injury during droughts. Susceptibility to clodding and puddling makes cultivation inadvisable under unfavorable moisture conditions.

To maintain or increase crop yields, improved management practices are needed, including systematic use of a crop rotation that includes legumes and grasses and proper and adequate fertilization. Lime, phosphate, and probably potash will be needed to greatly increase crop yields. The required nitrogen probably can be most economically supplied by including a legume in the crop rotation at frequent intervals. The organic-matter supply can be maintained or increased by using a grass crop in the rotation, by green manuring, or by applying barnyard manure. Terraces and other mechanical means of controlling runoff and erosion should not be necessary if other good management practices are carried out.

Acre yields under good management are 30 bushels of corn, 400 pounds of cotton, 800 pounds of peanuts, 1.2 tons of lespedeza hay, and 1.1 tons of red clover hay.

USE SUITABILITY, MANAGEMENT, AND PRODUCTIVITY OF SOILS

The use suitability of soils, the management they require, and their productivity are closely interrelated. The physical^a properties of soils limit the uses to which they are suited, determine to large extent the practices required for good management, and greatly affect their productivity. Climate and other factors, however, also have important influences on productivity.

The suitability of a soil for agricultural use is determined largely on the basis of its workability, conservability, and productivity—three factors that need explanation.

^aThe term "physical" connotes such soil properties as texture, structure, consistency, moisture relations, slope, stoniness, erosion, and other factors that might affect the kind and amount of plant growth.

Workability refers to ease of tillage, harvesting, and other field operations. Texture, structure, consistence, stoniness, and degree of slope are important among the properties that affect workability. The six relative terms used to describe workability are excellent, very good, good, fair, poor, and very poor. Soils of excellent workability are generally light to medium in texture, stone-free, and nearly level; they require a minimum of effort for tillage and harvesting. It is successively more difficult to perform normal farming operations on soils of very good, good, and fair workability. Nevertheless, such operation generally can be carried out feasibly for crops requiring tillage, even on soils of fair workability. Silty clay or clay soils, hilly soils, or soils containing enough chert to interfere seriously with cultivation are considered to have fair workability.

In this county soils with fair workability generally have slopes in excess of 30 percent or are so cherty or gravelly that tillage with ordinary implements is almost precluded. Soils with very poor workability are so steep or cherty, or both, that tillage can be done only with hand implements.

Conservability refers to the ease of maintaining productivity and workability. The principal factors considered in determining conservability are ease of maintaining the content of available plant nutrients at a high level, ease of controlling runoff and consequent loss of soil material, and ease of maintaining good tilth and good conditions for tillage. The relative terms used to describe conservability are the same as those used for workability. Excellent conservability means that productivity and workability can be maintained with management of minimum intensity. Very good, good, and fair conservability, respectively, represent soil conditions requiring progressively more intensive management for conservation of productivity and workability. Nonetheless, under good management now feasible the productivity and workability of a soil with very good, good, or fair conservability can be maintained when it is used for tilled crops. Poor conservability represents soil conditions such that workability, productivity, or both, can be conserved only by intensive management when used for tilled crops. As conditions are now, such intensive management generally is not feasible on most farms. Very poor conservability represents the extreme in difficulty of conserving productivity, workability, or both.

Productivity refers to the capacity of a soil to produce crops. A soil may be productive of a crop but not well suited to it because of poor workability, poor conservability, or both. The five relative terms used to describe productivity are very high, high, moderate, low, and very low. Soils of very high productivity have a good supply of available plant nutrients, nearly ideal moisture relations, a reaction approaching neutral, and favorable conditions for root development. Soils having high, moderate, low, and very low productivity are successively less favorable to plant growth.

USE SUITABILITY CLASSES

The suitability of a soil for agricultural use is determined largely by its productivity, workability, and conservability. For this report these factors were evaluated for each soil to determine its suitability for farming. Then, according to their relative suitabilities, all of

the soils are placed in five land classes—First-, Second-, Third-, Fourth-, and Fifth-class soils.

First-class soils are those most suitable for agriculture; those in the other classes are progressively less suitable. Under the systems of management ordinarily practiced in the county, the First-, Second-, and Third-class soils are considered physically suitable for crops requiring tillage. Fourth-class soils are considered not suitable or very poorly suitable for tilled crops but suitable for permanent pasture. Fifth-class soils are not suitable or only very poorly suitable for crops or permanent pastures; they are best used for forest.

In placing the soils in the five land classes, information obtained from farmers, soil scientists, extension workers, experiment station personnel, and others who work with the soil was used. Productivity, workability, and conservability were considered in making comparisons. For soils on which information was lacking, rankings were obtained by comparing them with soils of similar productivity, workability, and conservability for which information was available.

Land classes are a guide to suitable use of soils, but conditions on individual farms may require use of soils for purposes other than those considered suitable. On a farm with little soil suited to crops, for example, the operator may be forced to grow crops on land best suited to pasture or forest. The five land classes are separately discussed in the following pages, and the soils belonging to each class are listed in table 6, page 97.

FIRST-CLASS SOILS

First-class soils are productive, easy to work, easy to conserve, and physically well suited to production of the crops common to the area. They are good to excellent both for crops requiring tillage and for permanent pasture.

In comparison with other soils of the county First-class soils are all relatively well supplied with plant nutrients. Nonetheless, some crops grown on them will respond to fertilizer. They contain more lime than most other soils of the county, but are still slightly deficient in that element. All are well drained, but they retain moisture well and therefore maintain an adequate and even supply for plant growth. Good tilth is easily obtained and maintained, and the range of moisture conditions suitable for tillage is comparatively wide. The soils are fairly well supplied with organic matter in comparison with those of other classes. Circulation of air and moisture is normal; roots penetrate all parts of the subsoil freely.

None of these soils has any prominent adverse soil condition. They are almost free of stone; relief is favorable to soil conservation and tillage. None is severely eroded or highly susceptible to erosion. Natural fertility is relatively high, tillage is easy, and it is relatively simple to conserve soil fertility and the soil material.

SECOND-CLASS SOILS

Second-class soils are good for agriculture—fair to good for crops requiring tillage and fair to excellent for permanent pasture. They are at least moderately productive of most crops commonly grown in the area. In tillage, maintenance of good tilth, and normal circulation and retention of moisture they are moderately favorable.

Slopes are not greater than 12 to 15 percent, and the quantity of chert is not sufficient to interfere seriously with tillage. None is se-

verely eroded. Each is moderately deficient in one or more properties that contribute to productivity, workability, or conservability. None, however, is so seriously deficient in any property that it is poorly suited to crops requiring tillage.

The deficiencies vary widely among the soils. Some are fertile but sloping and moderately eroded; others are almost level and uneroded but relatively low in content of plant nutrients or have restricted drainage. The soils are relatively similar in their suitability for agriculture, but management requirements range widely because many different kinds of soils are included in this class. If the benefits of the agricultural suitability are to be obtained, management must be adjusted to the needs of the various soils in this class.

THIRD-CLASS SOILS

Third-class soils are fair for agriculture—poor to fair for crops requiring tillage and fair to very good for permanent pasture.

Each soil is so deficient in workability, conservability, or productivity, or in some combination of the three, that it is of limited suitability for tilled crops. These soils are better suited to tilled crops than are Fourth-class soils but less well suited than Second-class soils. Low content of plant nutrients, low supply of organic matter, low water-holding capacity, undesirable texture, structure, or consistence, strong slope, chertiness, inadequate natural drainage or one or more of these in combination limit physical suitability for crops requiring tillage. Management requirements range widely because soil characteristics are so diverse.

FOURTH-CLASS SOILS

Fourth-class soils are poorly suited to crops requiring tillage and poor to very good for permanent pasture. They are poor agricultural soils because they are well suited to only a limited number of uses. They may be important on some farms where soils suited to permanent pasture are in great demand.

Each soil is so difficult to work or to conserve, or both, that it is not now feasible to apply the management practices necessary for successful production of tilled crops. On some farms, however, soils well suited physically to crops requiring tillage may be so limited that it is good farm management to practice the intensity of soil management necessary for successful production of tilled crops on Fourth-class soils.

Fourth-class soils are used principally for pasture on farms where sufficient land well suited to crops is available, but in considerable acreage they are used for crops on farms where soils better suited to crops exist in acreages too small to satisfy the needs of the farm unit. The intensity of management practiced on areas of Fourth-class soils used for crops is generally not adequate for good soil conservation. As for the Third-class soils, management requirements vary widely for crops requiring tillage and for pasture.

FIFTH-CLASS SOILS

Fifth-class soils are very poorly suited to agriculture—very poor for crops requiring tillage and poor to very poor for permanent pasture.

Each soil of this group is so difficult to work or to conserve, is so low in productivity, or has such combinations of these unfavorable properties that it is not feasible to apply the intensity of management necessary for successful production of tilled crops. Each is so low in content of plant nutrients or has such poor moisture relations, or both, that common pasture plants produce little feed.

Fifth-class soils are best suited to forest under present conditions, even though they may be less productive of forest than soils of any of the preceding classes. Location of the farm or other conditions, however, may require use of some of them for pasture or crops, even though they are poorly suited.

SOIL USE AND MANAGEMENT

Soils are placed in the five land classes by making a total evaluation of the three factors workability, conservability, and productivity, but soils placed in the same use suitability class may differ considerably in the kind of management they need. They will differ in management requirements because the three factors used in evaluating differ in importance. One soil, for example, may require special practices to improve workability; another, special practices to increase productivity. For this reason soils are placed in groups according to differences in management requirements.

MANAGEMENT GROUPS

The soils of Perry County have been placed in 13 management groups. All soils of one group have similar management requirements. Except for group 13, all soils in one group are shown in the same color on the soil map. Group 13 includes two miscellaneous land areas—Riverwash and Mines, pits, and dumps—that are shown in separate colors, but all other soils of the group have the same color on the map. The soils of each management group are listed in table 6, and in the pages following each group is discussed separately. The management requirements of each group of soils are discussed in terms of (1) crops requiring tillage and (2) permanent pasture.

In studying the various management groups it should be borne in mind that management practices are suggested in terms of crop rotations suited to the soils. The management of the soil for one crop in a rotation generally affects the productivity of all other crops in the rotation. Management requirements for each crop are therefore dependent not only on the properties of the soil and the characteristics of the crop but also on the management that has been practiced for other crops in the rotation. It will be noted in comparing the various groups that management for permanent pasture may be the same for two groups of soils but different for tilled crops. This results because some soils require more exacting management than others when they are converted from permanent pasture to tilled crops.

The management practices suggested for each group are those considered good under conditions existing on many farms in the county. They are presented as an aid in planning the cropping system, but it is realized that adjustments may be necessary to meet requirements on specific farms. Many different combinations of management practices applied in various degrees of intensity can be used in most places

TABLE 6.—*Soils of Perry County, Tenn., arranged by use suitability classes and management groups, and the general productivity, workability, and conservability of each*

FIRST-CLASS SOILS—GOOD TO EXCELLENT CROPLAND AND PASTURE LAND

Management group and soil	General productivity	Workability	Conservability
GROUP 1:			
Bruno fine sandy loam ¹ -----	High-----	Very good-----	Very good.
Bruno loamy fine sand ² -----	Moderate-----	Good-----	Good.
Ennis silt loam-----	High-----	Very good-----	Excellent.
Huntington silt loam-----	Very high-----	Good-----	Do.
GROUP 2:			
Emory silt loam-----	do-----	Very good-----	Do.
Humphreys silt loam-----	High-----	do-----	Very good.
Eroded phase ¹ -----	Moderate-----	Good-----	Good.
Pickwick silt loam, eroded undulating phase.	High-----	do-----	Do.
Sequatchie fine sandy loam-----	do-----	Excellent-----	Very good.
Eroded phase-----	Moderate-----	Very good-----	Do.

SECOND-CLASS SOILS—FAIR TO GOOD CROPLAND; FAIR TO EXCELLENT PASTURE LAND

GROUP 3:			
Dunning silty clay loam ² -----	Moderate-----	Fair-----	Excellent.
Egan silty clay loam-----	High-----	do-----	Very good.
Lindside silt loam-----	do-----	Good-----	Excellent.
Lindside silty clay loam-----	do-----	Fair-----	Do.
Lobelville silt loam-----	Moderate-----	Good-----	Do.
GROUP 4:			
Pickwick silt loam:			
Rolling phase ³ -----	High-----	do-----	Good.
Eroded rolling phase-----	Moderate-----	Moderate-----	Fair.
Pickwick silty clay loam, severely eroded rolling phase. ³	Low-----	Fair-----	Do.
GROUP 5:			
Maury silty clay loam, eroded rolling phase.	High-----	do-----	Do.
Talbott silt loam, rolling phase.	Moderate-----	Good-----	Do.
Talbott silty clay loam, eroded rolling phase. ³	do-----	Fair-----	Do.
Talbott stony silty clay loam, rolling phase. ²	do-----	Poor-----	Do.
GROUP 6:			
Paden silt loam:			
Undulating phase-----	do-----	Very good-----	Good.
Eroded undulating phase-----	do-----	Good-----	Do.
Sango silt loam ² -----	Low-----	do-----	Do.
Taft silt loam ² -----	do-----	Fair-----	Do.
Wolftever silt loam-----	Moderate-----	Very good-----	Do.
Wolftever silty clay loam, eroded phase.	do-----	Good-----	Do.

See footnotes at end of table.

TABLE 6.—*Soils of Perry County, Tenn., arranged by use suitability classes and management groups, and the general productivity, workability, and conservability of each—Continued*

THIRD-CLASS SOILS—POOR TO FAIR CROPLAND; FAIR TO VERY GOOD PASTURE LAND

Management group and soil	General productivity	Workability	Conservability
GROUP 7:			
Dickson silt loam, rolling phase	Moderate	Good	Good.
Mountview silt loam:			
Rolling shallow phase	Low	do	Fair.
Eroded rolling shallow phase	do	do	Do.
Needmore silt loam:			
Rolling phase	Moderate	do	Good.
Eroded rolling phase	do	do	Fair.
Paden silt loam:			
Rolling phase ¹	do	do	Good.
Eroded rolling phase	Low	do	Fair.
GROUP 8:			
Ennis cherty loam ¹	Moderate	Fair	Very good.
Greendale cherty loam:			
Undulating phase ¹	High	do	Do.
Rolling phase	Moderate	do	Do.
Humphreys cherty loam ¹	do	do	Do.
Eroded phase	do	do	Good.
Lobelville cherty silt loam	do	Poor	Very good.
GROUP 9:			
Bodine cherty loam:			
Rolling phase	Low	Fair	Good.
Eroded rolling phase	do	do	Fair.
Etowah gravelly silt loam, eroded rolling phase.	Moderate	do	Good.
Pace cherty silt loam:			
Rolling phase	Low	do	Do.
Eroded rolling phase	do	do	Fair.
Eroded undulating phase	Moderate	do	Good.

FOURTH-CLASS SOILS—POOR CROPLAND; POOR TO VERY GOOD PASTURE LAND

GROUP 10:			
Melvin silt loam	Moderate	Fair	Excellent.
Robertsville silt loam	Low	do	Good.
GROUP 11:			
Dandridge silt loam:			
Hilly phase	Moderate	do	Poor.
Eroded hilly phase	do	Poor	Do.
Inman silty clay loam, eroded hilly phase.	do	do	Do.
Pickwick silty clay loam, severely eroded hilly phase.	Low	do	Do.
Talbott silty clay loam:			
Eroded hilly phase	do	do	Do.
Severely eroded rolling phase	do	Fair	Do.
Talbott stony silty clay loam:			
Hilly phase	Moderate	Poor	Very poor.
Eroded hilly phase	do	Very poor	Do.
Eroded rolling phase	do	Poor	Poor.
GROUP 12:			
Bodine cherty loam:			
Hilly phase	Low	do	Fair.
Eroded hilly phase	do	do	Do.

See footnotes at end of table.

TABLE 6.—*Soils of Perry County, Tenn., arranged by use suitability classes and management groups, and the general productivity, workability, and conservability of each—Continued*

FOURTH-CLASS SOIL—POOR CROPLAND; POOR TO VERY GOOD PASTURE LAND—Continued

Management group and soil	General productivity	Workability	Conservability
GROUP 12—Continued			
Etowah gravelly silt loam, hilly phase.	Low.....	Poor.....	Fair.
Mountview silt loam:			
Hilly shallow phase.....	do.....	Fair.....	Do.
Eroded hilly shallow phase.....	do.....	do.....	Poor.
Mountview silty clay loam, severely eroded rolling shallow phase.	Very low.....	do.....	Do.
Pace cherty silt loam, severely eroded rolling phase.	do.....	Poor.....	Fair.
Paden silty clay loam, severely eroded rolling phase.	do.....	Fair.....	Poor.

FIFTH-CLASS SOILS—VERY POOR CROPLAND, POOR TO VERY POOR PASTURE LAND¹ AND PROBABLY BEST SUITED TO FOREST

GROUP 13:			
Bodine cherty loam:			
Steep phase.....	Low.....	Very poor.....	Poor.
Eroded steep phase.....	Very low.....	do.....	Do.
Dandridge silt loam:			
Steep phase.....	Moderate.....	do.....	Very poor.
Eroded steep phase.....	Low.....	do.....	Do.
Severely eroded hilly phase.....	Very low.....	do.....	Do.
Etowah gravelly silt loam, severely eroded hilly phase.	do.....	Poor.....	Do.
Mines, pits, and dumps.....	do.....	Very poor.....	Do.
Riverwash.....	do.....	do.....	Do.
Rough gullied land (Talbott soil material).	do.....	do.....	Do.
Stony hilly land (Talbott and Colbert soil materials).	do.....	do.....	Do.
Stony rolling land (Talbott and Colbert soil materials).	do.....	do.....	Poor.
Stony rough land (Talbott and Colbert soil materials).	do.....	do.....	Very poor.
Talbott stony silty clay loam:			
Steep phase.....	Low.....	do.....	Do.
Eroded steep phase.....	do.....	do.....	Do.
Severely eroded hilly phase.....	do.....	do.....	Do.

¹ Second-class soil.

² Third-class soil.

³ First-class soil.

to achieve a given level of productivity. The proper choice of management depends on the farm as a unit. For example, nitrogen may be maintained by using legumes, manure, commercial fertilizer, or a combination of the three. The best method of maintaining nitrogen therefore depends on the farm business as well as on soil conditions.

The county agricultural extension agent should be consulted for latest information on the use and management of soils. Publications dealing with specific management problems may be obtained from him or by writing to the Tennessee Agricultural Experiment Station at Knoxville.

MANAGEMENT GROUP 1—WELL-DRAINED NONCHERTY SOILS OF THE BOTTOM LANDS

Management group 1 consists of Bruno fine sandy loam and loamy fine sand and Ennis and Huntington silt loams. These are good to excellent crop and pasture soils. All except some areas of Bruno soil are high to very high in productivity and easily to very easily worked and conserved. The soils are nearly level and not subject to erosion. All are relatively high in lime, organic matter, and plant nutrients and are replenished periodically by additions of fresh sediment. Moisture conditions are favorable to plant growth. Drainage is good, although the soils are subject to flooding.

Management requirements.—The soils of group 1 are suited to intensive use, but crops are limited largely to summer annuals because of the danger of floods. They are well suited to corn and many forage crops and very well suited to summer annual hay crops, as lespedeza and soybeans. Fertilizer or lime is not needed for continued high yields of the crops for which these soils are suited and used. Nonetheless, applications of fertilizer will bring a good response in many places. Corn yields are increased in some areas by using a short rotation that includes a legume crop to be turned under. The management of these soils is concerned chiefly with improving tillage practices, more timely seeding, and use of higher yielding varieties.

Pasture is well suited because of favorable moisture relations and relatively high fertility. Floods, however, may damage the vegetation by depositing mud. Weeds are vigorous and a definite detriment to pastures but may be easily eradicated by mowing. Pastures may respond to lime and fertilizer, but their need for such treatment is not exacting. Heavy grazing is less harmful to pasture than undergrazing.

MANAGEMENT GROUP 2—UNDULATING WELL-DRAINED FRIABLE RED AND BROWN SOILS

Emory silt loam, Humphreys silt loam and its eroded phase, Pickwick silt loam, eroded undulating phase, and Sequatchie fine sandy loam and its eroded phase compose management group 2. These are good to excellent crop and pasture soils, high in productivity and easily to very easily worked and conserved. They have mild slopes, are not seriously eroded, and are not very susceptible to erosion. The content of organic matter and plant nutrients is high compared to that for soils of the uplands. Moisture conditions are favorable to plant growth.

Management requirements.—Soils of group 2 are suited to intensive use for a wide variety of crops—corn, peanuts, cotton, small grains, alfalfa, red clover, crimson clover, sweetclover, and various vegetable crops. When other management requirements are met, the soils can be conserved and their productivity maintained or increased under rotations including a row crop every third year, provided the rotation includes a legume. Winter cover crops and green-manure crops are useful in conserving soil moisture and improving tilth and as a source

of nitrogen and humus. In planning the choice and rotation of crops, it should be realized that these soils are well suited to such exacting crops as alfalfa and red clover.

These soils are generally slightly to moderately deficient in lime, phosphorus, and nitrogen for the crops commonly grown. Properly conserved manure is an excellent source of both nitrogen and potash but it should be supplemented with a phosphate fertilizer to obtain a balance of plant nutrients. Corn, cotton, and small grains respond well to applications of a complete fertilizer. The legumes, especially deep-rooted ones, require lime and phosphorus, but if they are inoculated, will need no nitrogen. In a short rotation an inoculated legume crop will generally supply the nitrogen other crops need, especially if it is turned under.

Good tilth is easily maintained, and tillage operations can be carried on over a fairly wide range of moisture conditions without seriously impairing the physical properties of the soils. Controlling erosion and conserving soil moisture are not serious problems when crops are properly chosen and adequate amendments are used. Mechanical devices for controlling erosion are not generally needed, but contour tillage is a good practice wherever feasible.

Even though the soils of this group are very well suited to use as pasture land, they are seldom used for this purpose because they are so well suited to more intensive use. When used for pasture, the management is concerned with supplying amendments, chiefly lime and phosphorus, to suitable plants. Other requirements are proper control of grazing and scattering of droppings. Pasture that receives adequate amendments and is properly grazed does not present a serious problem in weed control, but mowing may be necessary to remove excess herbage and undesirable plants.

MANAGEMENT GROUP 3—IMPERFECTLY DRAINED NONCHERTY SOILS OF THE BOTTOM LANDS

Soils of management group 3—Dunning, Egam, and Lindsidesilty clay loams and Lindsides and Lobelville silt loams—are good for crops and good to excellent for pasture. As a group they are moderate in productivity, easily worked, and very easily conserved. Except for the moderately well drained Egam soil, they are imperfectly drained soils of first bottoms and are subject to overflow.

The soils are variable in content of lime, organic matter, and plant nutrients, but all have a relatively high content and are better supplied than the associated upland soils. Fresh sediment deposited by floodwaters aids in maintaining the supply of plant nutrients and organic matter. Imperfect drainage and susceptibility to flooding limit the variety of crops that can be grown. Many feed and forage crops, as corn, soybeans, alsike clover, redtop, and white clover, are expected to do well; but alfalfa, red clover, small grains, and cotton are poorly suited. Adequate supplies of moisture are generally available for plant growth except on the Egam soil, and crops are not injured by droughts so often as on the adjacent uplands.

Management requirements.—Group 3 soils are suitable for intensive use. Row crops can be grown every year or in alternate years, but a leguminous green-manure crop is needed in many places to maintain supplies of organic matter and nitrogen. Where practical, a short rotation of corn and hay crops is desirable.

Even though these soils receive annual increments of soil material, they are somewhat deficient in lime, phosphorus, potash, and nitrogen for some crops. All crops except legumes will respond to complete fertilizers; legumes need phosphorus and potash but no nitrogen. Lime is necessary for satisfactory stands of legumes, and it increases yields and improves the quality of the crops that follow.

Good tilth is difficult to maintain except on Lindside and Lobelville silt loams, and tillage may be delayed early in spring and during rainy seasons because drainage is imperfect and moisture conditions are unfavorable. Cultivation is possible over a very narrow range of moisture conditions; therefore, the seedbed is often not well enough prepared and tillage practices are poorly timed and inadequate.

The soils are not ordinarily susceptible to erosion, but it may be necessary to build up stream banks in some places to prevent scouring. The range of use suitability and general productivity can be increased by artificial drainage, but the advisability of drainage and the kind of drains to use on any particular area depend upon many factors, including cost, feasibility of drainage from an engineering standpoint, and kinds and acreages of other soils on the farm.

These soils are well suited to pasture, and fairly good pasture can be obtained by preparing the seedbed and seeding. Lime and phosphorus, however, will improve the quality and increase yields. Some mixture of redtop, orchard grass, white clover, hop clover, alsike clover, and lespedeza is suited. Control of grazing is important during the wet seasons. Otherwise, livestock trample the soils and injure physical properties. Mowing is necessary to eradicate weeds and remove excess herbage.

MANAGEMENT GROUP 4—ROLLING WELL-DRAINED FRIABLE RED AND BROWN SOILS

Group 4 consists of rolling and eroded rolling phases of Pickwick silt loam and the severely eroded rolling phase of Pickwick silty clay loam. These are good crop and good to excellent pasture soils, moderate to high in productivity, easy to work, and fairly easy to conserve. They are on 5- to 15-percent slopes, are moderately susceptible to erosion, and are seriously eroded in some places. In all except the more severely eroded areas they are moderately high in organic matter and plant nutrients. All have moisture conditions favorable to plant growth. Use suitability is wide. Corn, cotton, peanuts, small grains, soybeans, and many vegetable crops are suited; and if properly limed and fertilized, alfalfa, red clover, and like crops are well suited.

Management requirements.—To increase crop yields and maintain them at a higher level, systematic crop rotation and fertilization are required for soils of group 4. When other management requirements are met, the soils can be conserved under a 4- to 6-year rotation. A suitable rotation is wheat, red clover, grass for 3 years, corn followed by a cover crop, and cotton. In this rotation barley, rye, or oats, can be substituted for wheat; and soybeans, sweetpotatoes, peanuts, or a vegetable for corn or cotton. Vetch and crimson clover are excellent cover crops.

These soils are generally slightly to moderately deficient in lime, phosphorus, and nitrogen for most crops. The legume crops, especially deep-rooted ones, require lime and phosphorus but do not need nitrogen if they are inoculated. An inoculated legume crop, espe-

cially if it is turned under, usually supplies the nitrogen other crops in a rotation need. All crops respond to phosphorus. A good response may be expected if complete fertilizer is applied for corn, cotton, and small grains. Properly conserved manure—a good source of nitrogen and potash—should be supplemented with a phosphate fertilizer to obtain a balance of plant nutrients.

Good tilth is easily maintained, and tillage can be carried on over a fairly wide range of moisture conditions without impairing the physical properties of the soils. The soils are moderately susceptible to erosion, but runoff and erosion control should not be serious problems if other management practices are good. Contour tillage should be practiced wherever feasible, however, and contour strip cropping may be advisable on long slopes. Terraces may be necessary in some cultivated places and should be effective because the soils are permeable and have regular slopes. The loss of the surface layers from the included severely eroded soils has greatly increased the difficulty of water control. The productivity of these eroded areas can be maintained or increased by using a longer rotation that contains more close-growing crops and by making heavier applications of fertilizer.

The soils of group 4 are physically well suited to pasture; their management will be concerned with supplying amendments, chiefly lime and phosphorus, to suitable plants. Proper control of grazing and scattering of droppings are other requirements. Weed control is not serious on pastures adequately treated with amendments and properly grazed, but mowing is necessary.

MANAGEMENT GROUP 5—ROLLING WELL-DRAINED PLASTIC RED AND BROWN NONSTONY SOILS (NOT SEVERELY ERODED) AND UNEBODED STONY SOILS

Management group 5 is made up mainly of undulating to rolling heavy upland soils highly susceptible to erosion, but some moderately eroded areas are included. The soils are Maury silty clay loam, eroded rolling phase; Talbott silt loam, rolling phase; Talbott silty clay loam, eroded rolling phase; and Talbott stony silty clay loam, rolling phase.

The soils of group 5 range from medium to strongly acid in reaction and from moderately high to low in content of organic matter and most plant nutrients. The present content of organic matter and plant nutrients, especially nitrogen, depends largely on the cropping system that has been practiced and the loss of soil material by erosion. The Maury soil is especially high in phosphorus. The average depth to bedrock is about 5 feet, but bedrock outcrops in most areas and sometimes interferes with cultivation. These soils are poor to good cropland, but are good pasture land in most places. They are physically suited to most of the common crops grown in the county, and with lime and phosphate, deep-rooted legumes can be grown successfully.

Management requirements.—One of the principal problems in management of group 5 soils is the maintenance of good tilth; another is improvement of the physical condition of the soils so that they will absorb and hold a supply of water adequate for plant growth. The rate of runoff is high. A cropping system is needed that will aid in checking runoff and make best use of the water retained. In most areas a row crop can be grown safely once every 3 or 4 years if other management requirements are met. A rotation of corn, small grain, and red clover is suited. If the rotation is lengthened to accommo-

date it, alfalfa can be substituted for red clover. The deep-rooted legumes and green-manure crops, as crimson clover, vetch, and small grains, are desirable because they improve the physical condition of the soil and help maintain its supply of organic matter and nitrogen.

Except on the Maury soil, crop rotations such as the one mentioned in the preceding paragraph require lime and applications of phosphorus for the hay crop. Legumes are commonly difficult to establish, and applications of manure are helpful in obtaining stands on the eroded spots. The legume crop generally supplies enough nitrogen for the other crops in the rotation. The available supply of potash is sufficient for all except the high-yielding deep-rooted legume crops, such as alfalfa.

Tillage can be performed over a very narrow range of moisture content on the eroded soils, but good tilth is easily maintained on the uneroded ones. Contour tillage aids materially in conserving soil moisture and soil material, and strip cropping may be desirable on the longer slopes. Terracing is not advisable on the heavy-textured soils. Fall plowing is a good means of improving tilth, provided a cover can be established after plowing to prevent excessive runoff and consequent loss of soil material.

Good pasture can be established and maintained, and on many farms the soils are best used for this purpose. A good sod-forming pasture mixture should be seeded. If it is properly limed and fertilized, a mixture of bluegrass, redbud, orchard grass, lespedeza, and white, hop, and red clovers is suitable. Moderately close grazing and clipping will encourage the legumes at the expense of the grasses and thus maintain a better supply of nitrogen. Scattering of droppings will likely maintain potassium supplies, but some potash from commercial fertilizer may be needed at long intervals. Mowing a few times each season will effectively control weeds and brush.

MANAGEMENT GROUP 6—UNDULATING NONCHERTY IMPERFECTLY AND MODERATELY WELL-DRAINED FRIABLE YELLOW SOILS

The soils of group 6 are the undulating and eroded undulating phases of Paden silt loam; Sango, Taft, and Wolftever silt loam; and Wolftever silty clay loam, eroded phase. They have more exacting management requirements than soils of the previous groups, especially in regard to fertilization and the choice and rotation of crops. They are physically suitable for crops, but naturally low in fertility. As they have good tilth, gentle slopes, and are free of gravel or stone, they are easy to work.

In organic-matter and plant-nutrient contents these soils are low; in reaction they are strongly to very strongly acid. All have silt pans that interfere with water movement and restrict root penetration. Chiefly because of low fertility and low water-holding capacity, they are low in productivity and somewhat limited in use suitability. Alfalfa and like deep-rooted crops do not do so well as on soils of other groups that allow deeper penetration of roots. Nevertheless, these soils are fairly well suited to most of the crops commonly grown—cotton, corn, lespedeza, cowpeas, sericea, redbud, and sweetpotatoes.

Fertilizer and lime are required to establish alfalfa, sweetclover, and red clover, but even under the best of management, stands of these crops are difficult to maintain. The Taft soil is imperfectly drained and is fairly well suited to sorghum, corn, lespedeza, and soybeans.

Management requirements.—Soils of management group 6 are suited to moderately intensive use. When other management requirements are met, they probably can be conserved under rotations that include a row crop once in 3 to 5 years. In managing these soils, the kind of crop grown and the crop rotation chosen should be suitable. Because they are relatively low in organic matter and nitrogen, the rotation used should include a legume, which will help in remedying these deficiencies. Also, a growing crop should be kept on the land as much of the time as possible, for it will aid in preventing leaching of nitrogen and other soluble plant nutrients. All legumes should have grass sown with them. The grass helps conserve the nitrogen fixed by the legumes. All pasture-grass mixtures should contain legumes, for the legumes will supply the nitrogen the grasses need.

A rotation suitable for these soils is wheat the first year, a legume-grass mixture for 3 years, corn followed by a cover crop, and then cotton. A 4-year rotation can be used that consists of wheat or other small grain, red clover, corn followed by a cover crop, and soybeans. A 3-year rotation of small grain, lespedeza, and corn is also suitable. Barley, rye, or oats can be substituted for corn in these rotations; vetch or crimson clover can be used for the cover crop, but vetch is better suited.

Fertilization and liming are important. All crops respond to phosphorus and possibly potassium. Nitrogen, which is needed by all crops except the legumes, can be best obtained by using legumes in the rotation. Nitrogen fertilizers sometimes are profitably used for cash crops and as a top dressing on small grain. Lime is essential for the deep-rooted legume crops, and if applied for the legumes, will benefit all other crops in the rotation. Lime and phosphate are required to establish and maintain stands of alfalfa and sweetclover, and red clover needs smaller quantities of these amendments. Annual and sericea lespedezas are grown without amendments but respond very well when they are applied.

If other management is good, special practices for controlling runoff and erosion should not be necessary. All tillage, however, should be on the contour insofar as practicable. Cover crops should follow all clean-cultivated crops.

The soils are suited to pasture but do not produce very high yields, because they are low in water-holding capacity and in fertility. Pastures can be greatly improved by proper fertilization and seeding. Lime and phosphorus are required if good pasture is to be established and maintained. With proper fertilization, a mixture of orchard grass, redtop, lespedeza, and white, hop, and red clovers is well suited. Periodic mowing is necessary to control weeds. Grazing should be controlled in order to maintain a good sod at all times.

MANAGEMENT GROUP 7—ROLLING NONCHERTY MODERATELY WELL-DRAINED AND WELL-DRAINED FRIABLE YELLOW SOILS (NOT SEVERELY ERODED)

In management group 7 are Dickson silt loam, rolling phase; Mountview silt loam, rolling shallow and eroded rolling shallow phases; and the rolling and eroded rolling phases of Needmore and Paden silt loams. These soils are low in organic matter and plant nutrients and strongly to very strongly acid.

All have silt pans that interfere with water movement and restrict root penetration. Low fertility, low water-holding capacity, and

the presence of a siltpan make them relatively low in productivity and limited in use suitability. The Mountview and Needmore soils are exceptions in that they do not have a siltpan.

The soils are fairly well suited to peanuts, cotton, corn, small grains, sericea and annual lespedezas, and sweetpotatoes, but without special fertilization they are very poorly suited to red clover, alfalfa, and sweetclover. Even under the best management, alfalfa is difficult to maintain. Small-grain crops are better suited than corn.

Management requirements.—The management requirements of the soils of group 7 are more exacting than those of group 6, chiefly because of stronger slopes. Because these soils are highly susceptible to erosion, long rotations consisting largely of close-growing crops are desirable in most places. A suitable rotation consists of wheat, a legume-grass mixture for 3 years, and corn. If alfalfa, sericea lespedeza, or sweetclover is used as the legume, it is advisable to keep the land in that crop for 4 years if the stand can be maintained. Barley, rye, or oats can be substituted for wheat in the rotation, and peanuts, cotton, or sweetpotatoes for corn.

Fertilization and liming are important in maintaining and increasing yields. The soils are relatively low in all the major fertilizing elements, including lime, and management is concerned with supplying these in quantities adequate for growing crops. Phosphorus and most of the potash must be supplied by commercial fertilizer. Barnyard manure is an important source of nitrogen, potash, and organic matter. Nitrogen is most economically obtained by growing and properly using legumes. Nitrogen fertilizers are sometimes profitably used on cash crops and as a top dressing for the small-grain crop. Lime and phosphorus are essential for success with alfalfa, sweetclover, red clover, and other deep-rooted legume crops. Annual and sericea lespedezas are grown without amendments but need them for best results.

The management practices should be selected with particular concern for control of runoff and erosion. Runoff can be controlled partly by proper selection and rotation of crops and by use of soil amendments, but some special practices are needed in many places. Contour tillage is effective, as are properly planned and constructed terraces. Strip cropping is advisable on the longer slopes.

The soils are suited to pasture, but yields are low because of low fertility and low water-holding capacity. Fertilization with lime and phosphate and seeding with some mixture of orchard grass, redtop, lespedeza, and white, hop, and red clovers will greatly improve pasture. Grazing should be carefully controlled to maintain a good sod; periodic mowing is necessary to control weeds.

MANAGEMENT GROUP 8—WELL-DRAINED AND IMPERFECTLY DRAINED CHERTY SOILS OF THE COLLUVIAL TERRACE AND BOTTOM LANDS

Management group 8 includes alluvial and colluvial soils characterized by a great number of chert fragments on the surface and throughout the profile. These soils are Ennis cherty loam, the rolling and undulating phases of Greendale cherty loam, Humphreys cherty loam and its eroded phase, and Lobelville cherty silt loam. The Ennis and Lobelville soils are frequently flooded for short periods, the Humphreys are flooded infrequently, and the Greendale are usually not flooded.

The soils are medium to very strongly acid and moderate in content of organic matter and plant nutrients. Internal drainage of all except the Lobelville soils is rapid. The water-holding capacity is low. The soils are fairly well suited to most of the common crops of the county, but their suitability is somewhat limited by chertiness and droughtiness. They are well suited to early vegetables, small grains, crimson clover, and vetch but not so well suited to crops that mature late in summer or in fall.

Management requirements.—Soils of group 8 are suited to intensive use, but to maintain or increase yields, crop rotations and fertilization are required. The rotation can be short but should include a legume. A rotation consisting of wheat or other small grain, red clover, and corn is suitable. Peanuts or other row crops may be substituted for the corn, and sweetclover or lespedeza for the red clover.

Although these soils are younger and less leached than the associated soils of uplands, they are moderately deficient in phosphorus, nitrogen, and probably potash. All crops respond to phosphorus. In most places corn, small grains, and grasses respond to nitrogen and possibly potash. Properly inoculated legumes and legume-grass mixtures need no nitrogen but require phosphorus and potash. Barnyard manure is an excellent source of nitrogen, potash, and organic matter for all crops. Most of the soils are acid, and lime is therefore needed to maintain good stands of the deep-rooted legumes.

These soils are not susceptible to erosion in many places, but contour tillage should be practiced on the more sloping areas. The high content of chert interferes with tillage. In some places it may be practical to improve workability by removing the larger chert fragments on the surface.

These are fair to good pasture soils. In large part they are used for pasture, chiefly because they are near barnyards. Pastures are very good early in the grazing season but become poor late in summer and in fall. Some mixture of bluegrass, redbud, orchard grass, lespedeza, and white, red, and hop clovers is well suited. Management is concerned with supplying lime, phosphorus, and potassium to properly selected pasture mixtures; proper control of grazing; scattering of droppings; and mowing to remove excess herbage and eradicate weeds.

MANAGEMENT GROUP 9—ROLLING CHERTY WELL-DRAINED AND EXCESSIVELY DRAINED YELLOW SOILS

The soils of management group 9 are the eroded rolling and rolling phases of Bodine cherty loam; Etowah gravelly silt loam, eroded rolling phase; and the rolling, eroded rolling, and eroded undulating phases of Pace cherty silt loam. These soils are poor to fair as cropland and fair to good as pasture land. They are fairly well suited to crop production, but in many places it would not be practical to cultivate them.

Most of the Bodine soils occur on narrow winding ridge crests, chiefly in association with Fifth-class soils. Pace soils are mainly in small areas associated with Humphreys, Greendale, and Bodine soils. The quantity of chert or gravel interferes with tillage. The content of organic matter and plant nutrients is variable, but in comparison with other soils of the county, all soils of this group rate low to medium in supplies of both. The soils are strongly to very strongly

acid. Although they are poorly to fairly well suited to most crops grown in the county, their productivity is moderately low because they are low in fertility and in water-holding capacity.

Management requirements.—If used for crops, group 9 soils require long rotations that consist largely of close-growing crops and legumes and grasses. A suitable rotation is wheat, a legume and grass mixture for 3 years, and corn. Other small grains could be substituted for the wheat; cotton, soybeans, or other row crops, for the corn. It is important that a cover crop follow each clean-cultivated crop.

Fertilizer requirements vary, but all the soils are deficient in lime and some fertilizing elements. All crops respond to phosphorus, nitrogen, and possibly potash. The deep-rooted legume crops require lime and phosphorus. Nitrogen is most economically supplied by growing properly inoculated legumes in the crop rotation. Barnyard manure tends to increase the humus content and moisture-retaining properties of the soils and is also an excellent source of nitrogen and potash. The organic matter in the manure greatly aids in improving tilth. The quantities of all amendments needed will vary according to the management the soils received in the past.

Fairly good tilth is easily maintained, and workability is possible over a wide range of moisture conditions. Chert and gravel in the plow layer definitely interfere with tillage operations. Runoff is moderate; the loss of soil material and soil moisture generally is less than on the heavier limestone soils. Moisture conservation is important, however, for these soils are moderately susceptible to erosion and lose water rather rapidly through percolation. Runoff and erosion are greatly reduced if the soils are kept in close-growing grass and small-grain crops much of the time, but further measures may be required. Contour tillage should be practiced wherever feasible. Terraces are not needed.

All of these soils are fairly well suited to pasture. A mixture of bluegrass, orchard grass, redtop, white clover, and lespedeza can generally be established and maintained if deficiencies in plant nutrients are corrected. Bermuda grass may be used to advantage in some places as a permanent pasture sod. Lime and phosphorus are needed to establish and maintain good pasture. Careful control of grazing to avoid injury to pasture stands is necessary, especially during dry seasons. Clipping may be required to eradicate weeds.

MANAGEMENT GROUP 10—POORLY DRAINED SOILS OF THE TERRACE AND BOTTOM LANDS

The soils of management group 10—Melvin and Robertsville silt loams—are poorly suited to crops requiring tillage but are fair to very good for pasture. The areas are nearly level to slightly depressed and poorly drained. The Melvin soil, on stream bottoms, varies considerably both in fertility and reaction. The Robertsville soil, on stream terraces, is low in fertility and strongly to very strongly acid.

Robertsville silt loam is low in productivity of pasture plants. Both it and the Melvin would be improved by artificial drainage. If adequately drained, they would produce crops requiring tillage. The profitability of drainage depends on the cost and on the increase in yield that would result. Drainage of the Robertsville soil, in particular, is of doubtful practicability.

Management requirements.—Group 10 soils furnish pasture throughout spring, summer, and fall, but the forage is of poor to fair quality and low to medium carrying capacity. As the first step in pasture improvement, open ditches should be dug to remove much of the surplus surface water. After drainage has been improved, seedings of bluegrass, white clover, redtop, lespedeza, and Bermuda grass will do fairly well if lime and phosphate are used. Redtop and lespedeza can be grown without amendments, but the pasture is of lower quality. Weeds should be controlled by grazing and mowing.

Although they are poorly suited to most crops requiring tillage, these are good to excellent soils for the production of sorghum for sirup. If sorghum is planted late in the spring and harvested just before frost, only an occasional crop is lost because of excessive moisture or flooding. In most places sorghum responds well to complete fertilizer. These soils, especially on the first bottoms, are fairly well suited to soybean hay.

MANAGEMENT GROUP 11—HILLY SOILS, ROLLING MODERATELY ERODED STONY SOILS, AND ROLLING SEVERELY ERODED PLASTIC SOILS (MODERATE FERTILITY)

Soils of group 11 are poorly suited to crops requiring tillage. They are severely eroded, strongly sloping, stony, poor in tilth characteristics, extremely susceptible to erosion, or some combination of these. In this group are the hilly and eroded hilly phases of Dandridge silt loam; Inman silty clay loam, eroded hilly phase; Pickwick silty clay loam, severely eroded hilly phase; the severely eroded rolling and eroded hilly phases of Talbott silty clay loam; and the hilly, eroded hilly, and eroded rolling phases of Talbott stony silty clay loam.

On most farms these soils are best used and managed for pasture; compared to other upland soils in the county, they are good pasture land. As a group they are moderate in productivity and poor in workability and conservability. They are fairly well supplied with lime and mineral plant nutrients. Moisture-absorption is only fair, as the soils are heavy-textured. Because they are shallow, their water-holding capacity is moderately low to low and plants are injured by droughts.

Management requirements.—In some places it may be most profitable to use group 11 soils in their natural condition; usually, however, more intensive management is desirable. Seeding to a good pasture mixture that includes bluegrass and white clover aids in pasture improvement. Applications of lime and phosphate will aid in increasing the amount of white clover in the pasture mixture, and a higher quality, higher yielding pasture is thereby obtained. Potash may be needed to establish good pasture in places, but additional quantities probably will not be needed if droppings are scattered. Fertilizer for Inman soil should not contain phosphorus, because the soil is high in that element.

Adequate fertilization and carefully controlled grazing will eliminate most weeds, but mowing may be necessary. In some places outcrops may be high enough to interfere with the use of mowing machines. Even under good management, the carrying capacities of pastures are greatly reduced during the dry summer and fall. On well-managed pasture, practices for conserving soil material are not ordinarily needed, although stabilization of gullies by suitable struc-

tures may be necessary. Thin shading by widely spaced walnut and black locust trees is beneficial to pasture on many soils.

The soils of this group are not well suited to cultivated crops, but on some farms it may be necessary to use them for that purpose. If they are so used, extremely careful management is needed to avoid serious depletion. Long rotations consisting largely of close-growing hay and small-grain crops are best suited. Lime and phosphorus applied in moderate to large quantities at moderately long intervals are essential to the production of legumes and the better grasses. Potash may be needed for some crops, especially the legumes. Barnyard manure is a good source of both nitrogen and potassium, and because it increases the supply of humus, it helps to improve the physical properties of the soils.

Wherever feasible, all tillage operations should be on the contour. Terracing is not generally practical on these hilly comparatively shallow soils. On the longer slopes a system of strip cropping may be a useful means of conserving water and soil material. Check dams, or other structures, and vegetation will stabilize gullies.

MANAGEMENT GROUP 12—HILLY (NOT SEVERELY ERODED) AND ROLLING (SEVERELY ERODED) YELLOW SOILS OF LOW FERTILITY

The soils of management group 12 are light- to medium-textured, low to very low in productivity, and rolling to hilly. They are the hilly and eroded hilly phases of Bodine cherty loam; Etowah gravelly silt loam, hilly phase; the hilly shallow and eroded hilly shallow phases of Mountview silt loam; Mountview silty clay loam, severely eroded rolling shallow phase; Pace cherty silt loam, severely eroded rolling phase; and Paden silty clay loam, severely eroded rolling phase.

All these soils are low in lime, organic matter, and mineral plant nutrients, but some are much more favorable in these respects than others. Most of the soils are somewhat droughty because they are porous and also because water rapidly runs off their strong slopes. Unfavorable characteristics, as high content of chert or gravel, strong slopes, low fertility, poor tilth, or susceptibility to erosion, make these soils poorly suited to tilled crops. On most farms they are probably best used and managed when in pasture.

Management requirements.—Although group 12 soils are not naturally productive of pasture, good pasture can be established and maintained by good management. Lime, phosphate, nitrogen, and possibly potash are needed to establish pasture. If properly fertilized, the soils are suited to bluegrass, orchard grass, redtop, lespedeza, white, red, and hop clovers, and similar pasture plants. Bermuda grass can be used to advantage in many places. Grazing must be carefully controlled if a good sod is to be maintained. Periodic applications of lime and phosphate are necessary. Clipping of pasture is needed to control weeds but will be difficult to accomplish on many soils.

These soils are poorly suited to tilled crops, but it may be necessary to use them for that purpose on farms where the need for cropland is great. If they are used for crops, their productivity should be maintained by applying lime, phosphorus, and potassium and by keeping up or increasing their supply of nitrogen and humus. Long rotations consisting largely of close-growing hay and small-grain crops are best suited.

MANAGEMENT GROUP 13—STEEP SOILS, VERY STONY SOILS, AND SEVERELY ERODED HILLY SOILS

The soils of group 13 have some combination of undesirable features, such as steepness and chertiness, steepness and stoniness, steepness and low fertility, or low fertility and high susceptibility to erosion. They are not suitable for crops and very poorly suitable for pasture. Probably they are best used for forest on most farms. The group includes the steep and eroded steep phases of Bodine cherty loam; the steep, eroded steep, and severely eroded hilly phases of Dandridge silt loam; Etowah gravelly silt loam, severely eroded hilly phase; the steep, eroded steep, and severely eroded hilly phases of Talbott stony silty clay loam; and the land types—Mines, pits, and dumps; Riverwash; Rough gullied land (Talbott soil material); Stony hilly land (Talbott and Colbert soils materials); Stony rolling land (Talbott and Colbert soil materials); and Stony rough land (Talbott and Colbert soil materials). Riverwash and Mines, pits, and dumps are shown on the map by separate colors. All other members of the group are shown in the same color.

Management requirements.—The soils of group 13 are suited only to forest and therefore have not been subdivided into groups according to soil management requirements and responses. In large part these soils are now forested, and in general, a program of reforestation should be carried out on the areas not forested. In places a suitable forest cover will establish itself if properly protected from fire and livestock grazing; in others, planting will be necessary. Shortleaf pine is one of the species more suitable for planting on the more exposed or less favorable growing sites. On better sites, where moisture relations are more favorable to plant growth, black locust, yellow-poplar, and other deciduous trees may be desirable.

Practices employed in the forest management are (1) maintaining a full stand of desirable species, (2) systematic cutting and weeding of trees, (3) harvesting mature trees so desirable species may succeed them, and (4) controlling fires, browsing, trampling, and damage from other causes. For more detailed discussion of reforestation and forest management, see the section on Forests.

The soils of group 13 are not suited to crops and pasture but on some farms a shortage of better soils may force the use of some of them for those purposes. Where production of tilled crops is attempted, adequate liming and fertilizing and every reasonable supporting practice for water control are needed. The use of amendments and careful selection and rotation of crops are especially needed to encourage heavy vegetation. Strip cropping is usually required if productivity is to be maintained any length of time.

For the maintenance of pasture, addition of lime and fertilizer, particularly phosphorus, and other good management practices are required. Legumes should make up a considerable part of the pasture sod. In many places it is difficult to apply materials and to control weeds because slopes are steep and the areas are inaccessible.

ESTIMATED YIELDS

Estimated average acre yields of principal crops are given for two levels of management in table 7. In columns A are listed yields to be expected under the management now prevailing in the county; in columns B, yields to be expected under good management.

TABLE 7.—*Estimated average acre yields of crops be expected over a period of years on the soils of Perry County, Tenn.*

[Yields in columns A are those obtained under the most common management, those in columns B are obtained under good management]

Soil	Corn		Cotton		Peanuts		Lespedeza		Soybean hay		Red clover		Sorghum		Pasture		Use suita- bility class ¹
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
Bodine cherty loam	Ru	Ru.	Lb.	Lb	Lb.	Lb	Tons	Tons	Tons	Tons	Tons	Tons	Gal.	Gal.	Cow- acre-days ²	Cow- acre-days ²	
Eroded hilly phase	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	4
Eroded rolling phase	8	15	(³)	120	200	400	0.3	0.6	0.3	0.6	(³)	0.6	(³)	(³)	25	35	3
Eroded steep phase	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	5
Hilly phase	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	4
Rolling phase	10	20	100	160	400	500	4	.8	.4	8	(³)	8	(³)	(³)	25	40	3
Steep phase	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	4
Bruno fine sandy loam	35	45	(³)	(³)	800	1,000	1.5	1.7	1.6	2.0	(³)	(³)	(³)	(³)	100	110	5
Bruno loamy fine sand	18	25	(³)	(³)	500	600	4	7	.7	1.0	(³)	(³)	80	70	40	60	2
Dandridge silt loam																	3
Eroded hilly phase	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	30	50	4
Eroded steep phase	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	5
Hilly phase	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	40	65	4
Severely eroded hilly phase	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	35	5
Steep phase	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	5
Dickson silt loam, rolling phase	16	30	220	350	550	750	7	1.2	.6	1.3	5	1.2	70	80	50	80	2
Dunning silty clay loam	16	25	(³)	(³)	(³)	(³)	.9	1.0	1.2	1.4	(³)	(³)	70	100	90	100	3
Egmont silty clay loam	25	35	(³)	(³)	(³)	(³)	1.3	1.5	1.4	2.0	(³)	(³)	70	90	70	90	2
Emory silt loam	40	55	360	520	800	900	1.6	2.0	1.7	2.2	2.0	2.5	80	110	110	150	3
Ennis cherty loam	18	25	(³)	(³)	600	700	8	1.4	1.0	1.5	.6	1.3	70	80	70	90	1
Ennis silt loam	35	50	(³)	(³)	800	1,000	1.4	1.6	1.5	2.0	8	2.0	80	110	100	120	2
Etowah gravelly silt loam																	1
Eroded rolling phase	15	25	150	280	(³)	(³)	6	1.0	.6	8	(³)	(³)	(³)	(³)	40	60	3
Hilly phase	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	30	50	4
Severely eroded hilly phase	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	(³)	5
Greendale cherty loam																	
Rolline phase	20	30	(³)	(³)	500	700	9	1.1	8	1.2	6	1.0	50	70	70	90	3
Undulating phase	25	35	(³)	(³)	700	800	1.1	1.3	1.0	1.5	8	1.3	70	80	80	100	2
Humphreys cherty loam	18	25	220	380	700	900	7	1.0	.9	1.5	.8	1.3	60	80	70	80	3
Eroded phase	14	20	180	320	500	700	6	.8	8	1.3	.7	1.0	50	70	60	70	2
Humphreys silt loam	30	45	280	420	900	1,200	1.2	1.6	1.2	1.8	1.0	2.2	70	100	90	110	1
Eroded phase	20	35	200	380	800	1,000	1.0	1.4	1.0	1.5	8	2.0	60	90	80	100	2
Huntington silt loam	45	55	(³)	(³)	(³)	(³)	1.8	1.9	1.9	2.2	(³)	(³)	(³)	(³)	120	130	1

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See footnotes at end of table.

TABLE 7.—*Estimated average acre yields of crops be expected over a period of years on the soils of Perry County, Tenn.—Continued*

Soil	Corn		Cotton		Peanuts		Lespedeza hay		Soybean hay		Red clover		Sorghum		Pasture		Use suitability class ¹
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
Talbott silty clay loam:	Bu.	Bu.	Lb.	Lb.	Lb.	Lb.	Tons	Tons	Tons	Tons	Tons	Tons	Gal.	Gal.	Cow-acre-days ²	Cow-acre-days ²	
Eroded hilly phase.....	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	40	60	4
Eroded rolling phase.....	20	30	200	360	400	800	.9	1.4	.6	.8	.6	1.0	(?)	(?)	80	100	3
Severely eroded rolling phase.....	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	25	40	4
Talbott stony silty clay loam:																	
Eroded hilly phase.....	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	40	60	4
Eroded rolling phase.....	(?)	(?)	(?)	(?)	(?)	(?)	(?)	.8	(?)	(?)	(?)	(?)	(?)	(?)	50	70	4
Eroded steep phase.....	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	5
Hilly phase.....	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	40	60	4
Rolling phase.....	20	30	220	360	(?)	(?)	.9	1.4	.6	.8	.6	1.0	40	60	80	120	3
Severely eroded hilly phase.....	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	5
Steep phase.....	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	5
Wolfcreek silt loam.....	25	35	280	480	700	900	1.0	1.5	.8	1.5	.7	1.6	70	90	80	90	2
Wolfcreek silty clay loam, eroded phase.....	18	30	240	400	600	800	.8	1.2	.6	1.3	.5	1.1	60	80	70	80	2

¹ For an explanation of use suitability classes see pp. 93 to 96.² Cow-acre-days, used to express the carrying capacity of pasture land, is the product of the number of animal units carried per acre multiplied by the number of days during the year the animals are grazed without injury to the pasture; for example, a soil that supports 1 animal unit per acre for 360 days rates 360; a soil supporting 1 animal unit on 2 acres for 180 days rates 90; and a soil supporting 1 animal unit on 4 acres for 100 days rates 25.³ Crop not commonly grown, and the soil is physically unsuitable for its production under management specified.⁴ Crop not commonly grown, but the soil is considered suited to its production, although less suited than to crops for which yields are given.

The management practices used to obtain yields listed in columns A of table 7 are not the same for all soils. Current, or common, management for a particular soil is approximately that described for it in the section on Descriptions of Soil Units. (Look up the description of the soil in which you are interested and read under the heading "Present Use and Management".)

The yields given in columns A are based largely on observation made by members of the soil survey party, on information obtained by interviews with farmers and other agricultural workers who have had experience with the soils and crops of the area, and on comparisons with yield tables for counties in Tennessee having similar soils. Data giving specific crop yields by soil types are not generally available. Nevertheless, the yields given in columns A are based on a summation of local experience. They are considered fairly reliable estimates of the crop production that may be expected under the management commonly practiced.

The yields listed in columns B are those to be expected under good management. Good management refers to the proper choice and rotation of crops; the correct use of commercial fertilizers, lime, and manure; proper tillage methods; return of organic matter to the soil; mechanical means of controlling water; maintaining productivity or improving workability; and conserving soil material, plant nutrients, and soil moisture. The requirements of good management will vary according to the soils, but the practices recommended in the subsection Management Groups are used to define the level of management necessary to obtain the yields given in columns B of table 7. The section on Descriptions of Soil Units also gives information on good management for individual soils under the heading Use and Management Requirements. The yields in columns B are based largely upon estimates made by men who have had experience with the soils and crops of the county. In making the estimates, known deficiencies of the soils were considered, and it was then judged how much crop yields might increase if these deficiencies were corrected within practical limits. The yields in columns B may be considered as production goals, or in other words, as yields that may be obtained by using good management practices now feasible. By comparing yields in columns B with those in columns A, one may gain some idea of the response a soil will make if it receives good management. On practically all soils of the county, more intensive management will bring increased yields.

It is difficult to determine just what are the best management practices for each soil. Different crops on the same soils may require different management. Management for a given crop may be different when it is grown on different soils. Other factors than soils help determine what is good management for an individual farm and the soils on that farm. Among these factors are the proportionate acreage and distribution of the various soils on the farm, the combination of enterprises in the farm business, location of the farm relative to markets and other facilities, and prices.

SOIL ASSOCIATIONS

Soils of different kinds occupy different positions, as terraces, uplands, or stream bottoms, and they also occur in characteristic geo-

graphic associations. The Taft soil, for example, occurs on terraces and is nearly always associated with the Paden and Robertsville soils. Likewise, the Huntington soil occurs in stream bottoms and is generally associated with Lindsides soils of the bottoms and Wolftever soils of the low terraces.

By grouping soils that are geographically associated it is possible to prepare a generalized map showing large areas in which certain kinds of soils are associated. Such groups are called soil associations. A soil association may consist of a few or of many soils, and these soils may be nearly similar or very different. Each association, however, has a certain uniformity of soil pattern. A soil association therefore is a group of soils occurring together in a characteristic pattern, or in other words, a land area in which the kind, proportion, and distribution of the component soils can be defined.

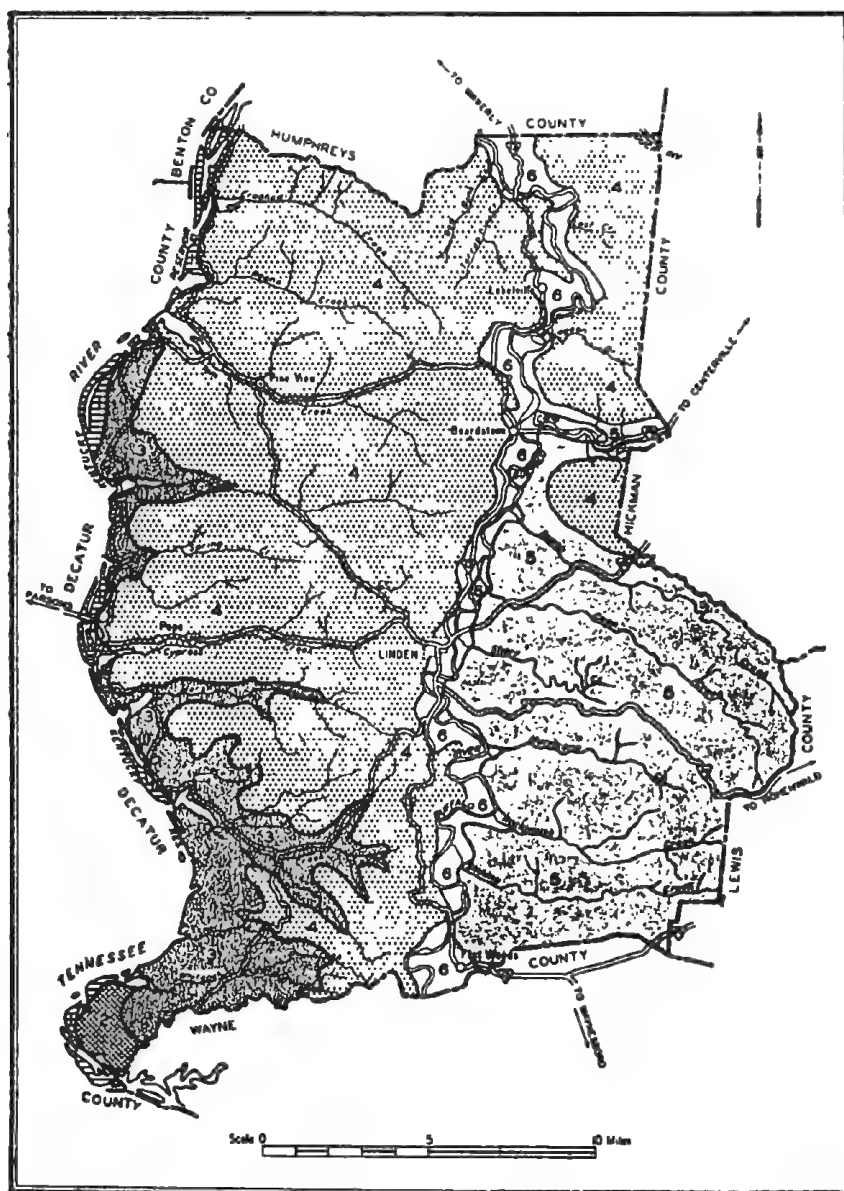
Soil associations are useful, for if a soil survey is to be employed to best advantage, it is necessary to know not only the physical characteristics of the individual soils but also the nature of broader areas made up of those soils. Planning can be done more efficiently if one can identify the soils in broad areas, understand their distribution, and interpret and predict their relations to agriculture. To illustrate, the present and potential use of a soil and its relative importance to agriculture may be greatly influenced by the soils with which it occurs in association. The advisability of using a given soil for corn production depends not only on its own suitability for that crop but also on the suitability of other associated soils for the same crop. If the associated soils are suitable for corn, the soil being considered may or may not be used for corn. If those associated soils are not suitable, the one in question may be heavily cropped to corn.

To facilitate an understanding of soil relations, the soils of Perry county have been placed in six associations that have fairly well defined geographic boundaries. The location of these associations is shown in figure 4; and each association is discussed separately in the pages following. More detailed information about the soils of each association can be obtained in the section on Soils.

EGAM-WOLFTEVER-LINDSIDE ASSOCIATION

The inextensive Egam-Wolftever-Lindsides association includes soils of first bottoms and low terraces along the Tennessee River. These soils have a somewhat undulating topography and are on natural levees near the river and on other low ridges and intervening swales or sloughs that run nearly parallel to the river. Typically, Bruno soils are on high natural levees, Huntington soil on low first bottoms, Egam soil on high first bottoms, and Lindsides and Melvin soils in the low swales. The Sequatchie and Wolftever soils are on nearly level to gently undulating low terraces. The Taft and Robertsville soils are in the level to slightly depressional areas in association with the Sequatchie and Wolftever. All of these soils are subject to overflow, but those on the low terraces are overflowed only at long intervals. Most of these soils have been flooded by waters of the Kentucky Reservoir since this survey was made.

As a group, the soils of this association are among the most fertile and productive in the county, but periodic overflows somewhat restrict their suitability for crops. Crops on some of these soils, as



- | | |
|----------------------------|-----------------------------|
| .Egum-Wolfever-Lindsie | .Bodine-Ennis-Humphreys |
| .Pickwick-Paden-Etowah | .Bodine-Dandridge-Greendale |
| .Talbot-Stony land-Lindsie | .Ennis-Humphreys-Pickwick |

FIGURE 4.—Soil associations of Perry County, Tenn.

the Egam and Wolftever, are susceptible to damage from droughts. The poorly drained Melvin and Robertsville soils are not suitable for crops but are suitable for pasture.

This area has a high percentage of cropland and is characterized by a corn-and-hog type of farming (12). Corn, peanuts, cotton, and lespedeza hay are the principal crops. Hogs are the most important livestock.

PICKWICK-PADEN-ETOWAH ASSOCIATION

The Pickwick-Paden-Etowah association consists of soils on old high terraces of the Tennessee River. Topography is undulating to hilly. On most farms, Paden soils are on the undulating ridge crests, Pickwick soils on the rolling ridge crests or ridge slopes, and Etowah soils on the steeper ridge slopes. Taft, Robertsville, Lindsides, and Melvin soils are less extensive members of the association but are more important to the agriculture of the area.

Second- and Third-class soils predominate, although there is a small but important acreage of First-class soils. The Paden soils, the most extensive ones in the association, are physically suitable for crops but their low water-holding capacity and low fertility cause low yields of most crops. The Pickwick soils are relatively productive, responsive to good management, and well suited to most crops of the county. The Etowah soils, on the stronger slopes and gravelly, are poorly suited to crops, but most areas are suitable for pasture.

This association supports a very small population, and a general type of farming is practiced. Little livestock is raised. Corn grown on the adjacent Egam-Wolftever-Lindsides association is fed on many farms of this association. In fact, many farmers that live in this association farm in the Egam-Wolftever-Lindsides association.

TALBOTT-STONY LAND-LINDSIDES ASSOCIATION

The Talbott-stony land-Lindsides association is in the southwestern part of the county on rolling to hilly relief. Drainage is well established. Talbott soils are the most extensive in the uplands; Emory soil, on colluvial lands; and Lindsides soils, on bottom lands. The Dunning, Maury, Inman, Huntington, and Melvin are other soils of small acreage but considerable agricultural importance. Large areas of the stony land types of Talbott and Colbert soil materials are distributed throughout the area. Bodine soils cap the ridges or are on the upper ridge slopes over most of the association.

Fourth- and Fifth-class soils are the most extensive in this association, but there is a considerable acreage of First- and Second-class soils. Many of the soils of uplands, owing to stoniness, steepness, or poor tilth, are poorly suited to crops, but most of them are suited to pasture. The Emory soil is highly productive and suited to intensive use for a wide variety of crops. The Lindsides soils are productive of corn, hay, and other forage crops, but their use suitability is limited by susceptibility to flooding and imperfect drainage.

Farms are chiefly small. Hogs and beef cattle are the main sources of cash income. More cattle are raised than in the Bodine-Ennis-Humphreys association. Corn, soybeans, and lespedeza are the principal crops. Feed for livestock is grown chiefly on Lindsides soils. On most farms pasture is on the poorly drained Melvin soil of the bottom lands or the Talbott soils of the uplands.

BODINE-ENNIS-HUMPHREYS ASSOCIATION

The Bodine-Ennis-Humphreys association is in the highly dissected parts of the cherty limestone hills section. The Bodine soils are the most extensive, but the Ennis and Humphreys soils are more important agriculturally. Other soils, small in extent but important to the agriculture of the area, are the Pace, Dickson, Greendale, Lobelville, and Melvin. The topography is characterized by narrow winding ridges and deep steep-walled V-shaped valleys. Typical areas have Dickson or Sango soils on the broader gently sloping ridge crests, steep Bodine soils on the ridge slopes, Greendale or Pace soils on the sloping alluvial-colluvial fans, gently sloping Humphreys soils on the low narrow stream terraces, and Ennis soils on the nearly level narrow stream bottoms.

Most of the soils of uplands in this association are Fourth- and Fifth-class soils. The soil of colluvial, terrace, and bottom lands, however, are predominantly First- and Second-class soils. The total area of the First- and Second-class soils is comparatively small.

The total acreage of soils suited to crops is very small. The upland soils, predominantly the Bodine, are steep, cherty, low in fertility, and therefore not suited or only poorly suited to crops or pasture. The Dickson and Sango soils, though suited to crop production, are isolated by extensive areas of Fourth- and Fifth-class Bodine soils. Consequently, most crops and pasture are grown on Ennis, Humphrey, Greendale, and Pace soils of bottom, terrace, and colluvial lands (pl. 9, 4). These last-named soils are moderately fertile and productive, but they contain chert fragments in numbers sufficient to interfere with cultivation in many places.

Most farms of this association are small. Peanuts and beef cattle are the chief sources of income. An estimated 25 percent of the cleared land is used for corn. Lespedeza is the principal hay and pasture crop, and small acreages are planted to peanuts, soybeans, and sorghum. Farming is influenced by the adjacent bottom-land areas of the Egam-Wolftever-Lindside association, for the corn-and-hog type of farming followed on the creek bottom soils is such that little use is being made of these adjacent upland soils.

BODINE-DANDRIDGE-GREENDALE ASSOCIATION

The chief soils in the Bodine-Dandridge-Greendale association are the Bodine, Dandridge, Needmore, Greendale, Ennis, Humphreys, and Lobelville. Like the Bodine-Ennis-Humphreys association, this one is highly dissected and characterized by narrow winding ridges and deep steep-walled V-shaped valleys. It differs, however, in having Dandridge soils on many of the lower slopes, in having a larger proportion of imperfectly drained Lobelville soils, and in having a smaller acreage of Pace soils. Typical areas have Dickson or Mountview soils on ridge crests, Bodine soils on steep upper ridge slopes, Dandridge soils on lower ridge slopes, Greendale soils on sloping alluvial-colluvial fans, gently sloping Humphreys soils on narrow stream terraces, and nearly level Ennis and Lobelville soils on stream bottoms.

Most soils of the uplands are Fourth- or Fifth-class soils, but those of colluvial, terrace, and bottom lands, though of small acreage, are predominantly First- and Second-class soils. The percentage in crop-

land is about the same as on the Bodine-Ennis-Humphreys association, but the proportion of pasture-adapted soils is higher. The Bodine are the most extensive soils of uplands, but owing to steepness, chertiness, and low fertility, they are unsuited or very poorly suited to crops and pasture. The Dandridge soils, which occupy the lower positions, generally have milder slopes and are more fertile than the Bodine soils; they are well suited to pasture production in most places. Most of the crops are grown on Ennis, Humphreys, Greendale, and Lobelville soils of the bottom, terrace, and colluvial lands. These soils are moderately fertile and productive, but in many places contain sufficient chert fragments to interfere with cultivation. Owing to periodic overflow, however, and in the case of the Lobelville soils, to imperfect drainage, they are somewhat limited in crop adaptation.

Small farms predominate, and cattle are the chief source of cash income. Small self-sufficing farms are usually located near the heads of creeks.

ENNIS-HUMPHREYS-PICKWICK ASSOCIATION

The chief soils of the Ennis-Humphreys-Pickwick association are Pickwick, Paden, Ennis, and Humphreys. They are on first bottoms and low and high terraces of the Buffalo River. Other less extensive and less important soils are the Lobelville, Taft, Robertsville, Greendale, and Pace. Typical areas have Paden and Pickwick soils on high terraces, Humphreys soils on low terraces, and Ennis soils on first bottoms.

This association has the highest percentage of crop-adapted soils, and in general they are soils more fertile and productive than those of any other association. Most soils of first bottoms and low terraces are First-class, and those of high terraces are Second- or Third-class. Small areas of Second- Third-, and Fourth-class soils, however, are on first bottoms and low terraces, and a very small acreage of First-class soils is on high terraces. The Pickwick and Paden soils of high terraces are well suited to crop production but vary greatly because of slope, degree of erosion, and past use and management. They are suited to less intensive use than the associated soils of first bottoms. The Humphreys soils are productive, easy to cultivate, and suited to a wide variety of crops. The Ennis soils are productive, but periodic overflow limits their use suitability.

The type of farming is varied. Most farmers follow a cash-grain or livestock type of farming. Corn, the principal crop, is fed chiefly to hogs. Many beef cattle are also fed.

FORESTS¹

Perry County was once heavily timbered. White oak, walnut, black oak, and hickory trees of magnificent size were on all the slopes and in the bottoms; chestnut oak, valuable for its bark, was very abundant (11). The first settlers usually considered the heavy growth of timber on the fertile Huntington, Lindside, Maury, Ennis, and Humphreys soils a nuisance not an asset, for clearing these productive soils required much labor.

¹ Prepared by G. B. Shivery, extension forester, University of Tennessee.

The areas now used for crops and improved pasture are largely alluvial lands and bottom lands following the drainage pattern of the Buffalo and Tennessee Rivers and their tributaries. Most of the upland is still wooded. Forested areas produce a rather large quantity of timber products, principally cross ties, and are used as open range for livestock.

TYPES OF FOREST COVER

The timber-producing areas are about 82 percent in upland hardwoods, 15 percent in blackjack oak-hardwoods, 1 percent in oak-chestnut, 1 percent in yellow pine-hardwoods, and 1 percent in cedar-hardwoods. In most places a distinct correlation exists between soil associations and these broad forest types. Forest land is confined largely to a few soil types and phases that are extensive in area. Although fire, grazing, and overcutting of timber have destroyed many obvious associations, observations indicate a definite relation between soil separations and types of forest cover.

The upland hardwoods forest type, the most extensive in the county, consists largely of mixed oak, hickory, yellow-poplar, blackgum, and basswood. Timber of the upland hardwoods type is merchantable except where depleted by forest fires and overcutting. The upland hardwoods forest is characteristic of the Dandridge, Paden, Pace, Greendale, and Bodine soils and occurs on all forested soil associations except those specifically mentioned in the following paragraphs as being occupied entirely or in part by other types of forest cover.

The cedar hardwoods forest type, in which cedar comprises 25 to 75 percent of the total dominant and codominant stems, occurs principally on the Talbott-stony land-Lindside soil association.

The bottom-land hardwoods forest type occurs largely in the Egam-Wolftever-Lindside soil association on Melvin, Lobelville, Lindside, Dunning, and Robertsville soils. Predominant species are red, black, and tupelo gums, willow, swamp white, water, and swamp chestnut oaks, green ash, sycamore, cypress, hackberry, red maple, elm, and silver maple.

The yellow pine-hardwood forest occurs in limited areas on upper slopes of Bodine soils in the vicinity of Pine View and Flat Woods in the Bodine-Ennis-Humphreys association. In this forest type pine makes up 25 to 75 percent of the total dominant and codominant stems.

The blackjack oak-hardwoods forest type occurs in small areas on many ridge tops in the Bodine-Ennis-Humphreys and Bodine-Dandridge-Greendale soil associations, especially on the Sango and Dickson soils and on upper slopes of the Bodine soils. The trees in this forest are of a size and quality generally not acceptable as sawtimber. The principal species are post, blackjack, scarlet, white, chestnut, and Southern red oaks, pignut hickory, blackgum, sourwood, dogwood, and red maple.

In all of the soil associations, whatever the type of forest cover, the aspect of the slopes, or the direction toward which they face, markedly influences the species in the stand and the quality of the timber. For example, a more vigorous growth and higher percentage of more desirable species is on north- and east-facing slopes. Similarly, growth is more vigorous and desirable on the lower part of long slopes. Blackjack, post, scarlet, and chestnut oaks are conspicuous

on the upper Bodine slopes, whereas on the lower slopes in the semi-colluvial positions white and Southern red oaks, white and scalybark hickories, and yellow-poplar produce sound long-bodied specimens.

FOREST RESOURCES

About 80 percent of Perry County is forested, and of this 44 percent is farm woodland and 56 percent is private nonfarm forest. About 600 acres are public forest, and much forest land is owned by absentee timber-holding companies. Based on the number of farms reporting woodland in 1940, the average farm woodland was 163 acres in size.

The total area of forest land in the county is classified as 22 percent sawtimber, 17 percent cordwood, and 61 percent below cordwood. Estimates of timber volume, drain, and growth made in 1940 for the area included in Dickson, Hickman, Houston, Humphreys, Lewis, Perry, Stewart, and Wayne Counties are representatives of conditions in Perry County alone, although increased cutting during the war years changed the situation to some extent.^a These estimates show that sawtimber is being depleted and that the supply of cordwood is increasing. Furthermore, much of the cordwood is suitable only for fuel, chemical wood, or pulpwood.

Twenty active sawmills were in the county in 1942, and lumber production amounted to 8,902 M board feet of hardwood and 137 M board feet of softwood. In 1912 there were 18 active sawmills, one of which cut more than 1,000 M board feet a year. In 1909 there were also 18 sawmills. Eight hundred cords of chestnut extract wood were cut in 1941.

From a study of timber production on major soil types in Humphreys County it was concluded that improved cutting, grazing, and fire-control practices would build up from the present growing stock a stand that would double the average growth an acre now prevailing.^b Inasmuch as Perry County has similar environment and soils, improved management practices would be expected to increase timber yields similarly.

FOREST MANAGEMENT

INDIRECT BENEFITS

The direct benefits of good forest management are evident in better returns received from better timber, but there are important indirect benefits, especially in areas subject to erosion. A protective layer of forest litter absorbs the impact of rain, preserving the tiny pores and channels between the soil particles as the water makes its way downward. Fungi, bacteria, and tiny animals that consume the litter and each other result in a dark-brown colloidal substance, or humus, which when carried downward into the mineral soil by percolating waters, improves both physical structure and fertility and also absorbs water. Porosity is further achieved by the channels left after roots decay. The soil-binding function of the surface roots is highly beneficial; the densest network of roots is found in the lower parts of well-developed layers of litter.

^a TENNESSEE STATE REPORT. WAR PRODUCTION GOALS AND THEIR ATTAINMENT: FORESTRY AND FOREST PRODUCTS. CI-9949, 23 pp., illus. 1942. [Processed].

^b SHIVERY, G. B., ODOM, J. N., JENKINS, C. HUMPHREYS COUNTY FORESTRY SURVEY. 25 pp., illus. 1937. [Unpublished. Copy on file at Tenn. Agr. Ext. Serv.]

Results obtained at the erosion station near Statesville, N. C., show a loss of only 0.002 ton of soil and 0.06 percent loss of rainfall from virgin woods (4). A companion wood plot burned twice yearly shows runoff of 11.5 percent and a soil loss of 3.08 tons an acre, as compared to 0.06 runoff and 0.001 ton an acre soil loss on an unburned plot. Similar experiments at Zanesville, Ohio, for a 9-year period show runoff as 20.6 percent on cultivated land, 13.8 percent on pasture, and 3.2 percent on woodland. In these Indiana experiments the soil loss was 17.18 tons an acre on cultivated land, 0.1 ton on pasture, and 0.01 ton on woodland (3).

These experiments show that erosion control and moisture absorption are maximum under complete forest cover. Soils forested with old-growth timber are more porous and absorb water much more rapidly than soils cultivated. Where forest cover is properly maintained, even second-growth forested soil does not lose its porosity unless it is overgrazed or the litter is destroyed by fire (2).

MANAGEMENT PRACTICES

FIRE PREVENTION

Control of forest fires is necessary to maintain maximum soil porosity, to control erosion, and to achieve satisfactory production of timber. Most of the forest in the county burns annually (pl 9, B), and much of it is consequently in a low state of productivity. Many farmers burn forest because they have the false idea that burning will improve grazing on the open range.

The Forestry Division, Tennessee Department of Conservation, has been conducting a limited fire-control program for more than 20 years. Under the Civilian Conservation Corps program a 60-foot tower was erected at Beardstown. From this and three other forest-fire towers in adjoining counties, approximately three-fourths of the forest land is visible. Telephone lines connect the tower with crews of forest wardens and the other towers. Besides the tower man there are 13 crews of local wardens headed by 2 district and 11 deputy wardens.

In the area organized for protection, during the period 1941-45, an average of 28 fires yearly burned 55,328 acres, or an average of 1,976 acres per fire. About 33 percent of these fires were incendiary in origin, 20 percent were attributed to hunters, 13 percent to smokers, 11 percent to brush burning, 7 percent to lumbering, 2 percent to campers, and 14 percent to miscellaneous and unknown causes.

CONTROL OF GRAZING

Control of grazing is necessary not only for satisfactory production of timber but also to maintain soil porosity and control erosion. Indiana experiments prove that grazing of forested land does not pay. Woodland grazing under intensities of 2, 4, or 6 acres allowed per animal unit, without supplementary feeding, resulted in serious deterioration of the animals over a 6-months period (5). Wisconsin experiments show that woodland pasture produces only one-fifth as much forage an acre as open pasture and less than 10 percent as much as renovated pasture (1). Forage in shaded areas was also less palatable to livestock than comparable forage in unshaded open areas. The timber-producing capacity is gradually destroyed by repeated browsing, and the natural regeneration of the stand is prevented.

Compaction of soil, disturbance of humus, and resulting interference with soil porosity lessen water absorption.

CUTTING PRACTICES

Improved cutting practices are needed because cull timber in cut-over woodland and forests hinders development of potential crop trees. Farm woodland can be materially improved by using cull trees for fuel and other minor farm needs or by cutting them for pulpwood or chemical wood. Crooked, short, bushy-topped, unsound, or slow-growing trees should be cut; the straight, tall, well-crowned, vigorous ones should be reserved to produce more valuable timber products.

PLANTING

In places, particularly on the severely eroded Fourth- and Fifth-class soils, it is necessary to resort to planting forest trees. Aside from ordinary planting of eroded areas, there is opportunity for underplanting to supplement natural reproduction where the woodland is open and understocked. Underplanting is particularly appropriate in the black-jack oak-hardwoods type of forest. Where openings are large enough, the scanty stand can be supplemented with shortleaf pine seedlings. Where it is practical to control sprouting of black-jack oak and associated species on the upper slopes of Bodine soils, the land would yield a more valuable product if converted to shortleaf pine.

Each severely eroded area presents a specific problem in reforestation. If planting is to be successful, advance preparation of the land, such as breaking and mulching galled areas, building simple low check dams in gullies, and plowing contour furrows, is necessary. Under the program now followed, and particularly in areas requiring less preparation, the landowner is encouraged to do the entire job of planting. He uses forest tree seedlings provided by the Tennessee Valley Authority.

As a part of a preliminary examination of any area, species should be selected that suit the particular soil. Degree of erosion, exposure, and other local features should be considered. Farmers frequently specify black locust for planting because they need fence posts, but pine is usually better adapted to the growing conditions encountered on land best used for forest.

Black locust do very poorly on all severely eroded areas, no matter what the soil type. For the severely sheet eroded intergully areas on Bodine, Dandridge, and Inman soils, shortleaf pine is recommended. Growing conditions may be so severe on certain badly eroded galled spots that Virginia pine must be used.

Black locust usually grow well in well-aerated fill material washed from high grade limestone. For example, they do well on the Maury soil. Growth of black locust is rapid in the initial stages on many of the upland soils if lime and phosphate are applied and the trees are cultivated 1 or 2 years. Fill material behind check dams on Dickson, Paden, and Bodine soils is better suited to shortleaf or loblolly pine. On eroded Talbott soils and stony lands it is best to encourage natural seeding of redcedar. This can be done by planting locust on parts of the area where fill material has accumulated. The locust will afford protection until the redcedar can establish itself.

MORPHOLOGY AND GENESIS OF SOILS

Soil is the product of soil-forming processes acting on materials deposited or accumulated by geologic agencies. The characteristics of the soil at any given point are determined by (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material has accumulated and existed since accumulation; (3) the plant and animal life in and on the soil; (4) the relief or lay of the land; and (5) the length of time the forces of soil development have acted on the soil material (14).

Climate and vegetation are the active factors of soil genesis. They act on the parent material and change it from a mass of inert material to a body that has a definite morphology. Their effects on the parent material are modified to varying degrees by the influence of relief, which affects drainage, the quantity of water that percolates through the soil, the rate of natural erosion, and vegetation. The nature of parent material also guides the course of action that results from the forces of climate and vegetation and is important in determining internal soil and climate and the kinds of vegetation that grow. Finally, time is necessary for the changes to take place, and age becomes a factor of soil genesis. Time is required for the development of the soil into a body that is in equilibrium with its environment. The degree of such development depends not only on time, but also on the rate of action of the forces of climate and vegetation as that rate is guided by the factors of relief and parent material.

The factors of soil genesis are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effects of any one unless conditions are specified for the other four. They are so complex in their interrelations that many of the processes that take place in soil development are unknown.

The purpose of this section is to present the outstanding morphological characteristics of the soils of Perry County and to relate them to the factors of soil formation. Physical and chemical data are limited for these soils, and the discussion of soil genesis and morphology is correspondingly incomplete. The first part of the section deals with the environment under which the soils exist; the second, with specific great soil groups and the part environment has played in determining the morphology of the member soils.

GENERAL ENVIRONMENT AND MORPHOLOGY OF SOILS

PARENT MATERIALS

The parent materials of soils of Perry County may be considered in two broad classes: (1) Materials residual from the weathering of rocks in place and (2) materials transported by water, wind, or gravity and laid down as unconsolidated deposits of clay, silt, sand, and rock fragments. The residual materials are related directly to the underlying rocks from which they were derived; transported materials, to the soils or rocks from which they were washed or blown.

The residual parent materials are derived through the weathering of consolidated sedimentary rocks, limestone, shale, and unconsolidated rocks. The properties of these materials are strongly reflected in many of the properties of the soils developed from them. These rocks were laid down as unconsolidated sediments, and some were

gradually converted to consolidated rocks. Some of the rocks are so young geologically that they have not been consolidated.

Certain soils developed from residual materials are generally associated with particular rock formations or parts of rock formations. Soils of the Maury and Inman series are derived from the residuum of phosphatic limestone and shale of the Hermitage formation. The Talbott soils are associated with Dixon and Decatur limestones. Bodine soils are associated with the Harriman and Fort Payne chert formations; Dandridge and Needmore soils are chiefly from Ridge top shale.¹⁰ The soils of the Dickson, Sango, and Mountview series are derived from a thin layer of loess over other parent materials.

Also, the characteristics of transported materials are reflected in some of the properties of the soils derived from them. Soils of the Pickwick, Paden, Taft, Robertsville, Wolftever, Huntington, Lindsay, and Melvin series are derived from transported materials that are highly mixed but consist mainly of limestones and products of their decomposition. The Pace, Humphreys, Ennis, Lobelville, and Greendale soils include material transported from cherty limestone materials. The Bruno and Sequatchie soils are derived from transported materials that consist mainly of sandstone or Coastal Plain sand materials.

Although a consistent relation exists between the kinds of parent materials and some of the characteristics of soils, other soil properties, especially those of regional significance from the standpoint of soil genesis, cannot be correlated with kinds of parent materials and must be attributed to other factors.

CLIMATE

The climate of Perry County is temperate and continental. The moderately high temperatures favor rapid chemical reactions under the moist conditions that exist in the soil most of the time. The high rainfall favors intense leaching of soluble materials and eluviation of colloidal materials downward in the soil. The freezing of the soil for only short periods and to only shallow depths further intensifies the degree of weathering and translocation of materials.

The general climate is relatively uniform in the county, but small local differences exist because of variations in slope and in exposure of land. On the south- and west-facing slopes the average daily and annual temperature of the soil is somewhat higher than on the north- and east-facing slopes. Soil temperatures are higher on the steeper slopes. Average moisture content is less on the south and west slopes than on the north and east slopes. These soil moisture and temperature conditions affect the growth of vegetation and the length of time that the soil is frozen. Although the differences are small, they are significant and may be responsible for some of the local variations in soils derived from similar parent materials. Over the entire county, however, the differences in climate are not sufficient to account for broad differences that exist among the soils, even though the climate is responsible for some of the outstanding properties that many of the soils have in common.

¹⁰ POND, W. F. GEOLOGIC MAP OF TENNESSEE. Div. of Geology, Tenn. Dept. of Education. 1933.

PLANT AND ANIMAL LIFE

Trees, shrubs, grasses, other herbaceous plants, micro-organisms, earthworms, and various other forms of plant and animal life live on and in the soil and are active in the soil-forming processes. The nature of the changes these various biological forces bring about depends, among other things, on the kinds of life and the life processes peculiar to each. The kinds of plants and animals that live on and in the soil are determined by environmental factors, including climate, parent material, relief, age of the soil, and the associated organisms. Climate is the most apparent, though not always the most important, influence in determining the kinds of macroflora that grow on the well-drained well-developed soils. In this way climate exerts a powerful indirect influence on the morphology of soils.

A general oak-hickory forest association was on most of the well-drained well-developed soils, although locally there may have been large proportions of chestnut and yellow-poplar in the forest stands (see the section on Forest). There were probably differences in the density of stands, the relative proportion of species, and the associated ground cover. Forests in the county as a whole, however, appear to have been relatively uniform. It is doubtful that any of the marked differences in properties among the well-drained well-developed soils are the direct result of differences in vegetative cover.

Most of the trees, chiefly of the deciduous type, are moderately deep to deep feeders on plant nutrients in the soil. Their leaves range considerably among species in content of various plant nutrients, but, in general, the quantities of bases and phosphorus returned to the soil in leaves of deciduous trees are high as compared to those returned by coniferous trees. The leaves return essential plant nutrients to the upper part of the soil from the lower part and thereby retard the depleting action of percolating waters.

Much organic material is added to the soil in the form of dead leaves, roots, and entire plants. Most of it is added to the A horizon, where it is acted upon by micro-organisms, earthworms, and other forms of life and by direct chemical reactions. In Perry County, dead leaves and such materials decompose at a rapid rate because temperature and moisture conditions and the micropopulation of the soil are favorable. Under similar drainage conditions organic material does not accumulate on well-drained sites in this county to the extent that it does in cooler regions.

Little is known of the micro-organisms, earthworms, and other population of the soils, but their importance is probably equal to that of the vegetation.

CLASSIFICATION OF SOILS

The soils of the county are classified in table 8 so that their genetic relations may be more easily understood. The great soil groups under each order are shown, and the various soil series are listed under each great soil group. The source and kinds of parent materials and the relief of each series are shown. Inasmuch as climate and vegetation are relatively uniform throughout the county, they cannot account for the broad differences in the soils and are not listed in the table.

TABLE 8.—*Soil series of Perry County, Tenn., classified by higher categories, with notes on relief and parent material*

ZONAL SOILS		
Great soil groups and series	Relief	Parent material
Red Podzolic soils:		
Talbott.....	Undulating to steep.	Residuum from— Argillaceous limestone.
Maury.....	Undulating to rolling.	Phosphatic limestone.
Pickwick.....	Undulating to hilly.	Mixed alluvium covered with a thin loesslike silt mantle.
Etowah.....	Hilly to steep.	Alluvium from a wide variety of rocks, including limestone.
Yellow Podzolic soils:		
Pace.....	Undulating to rolling.	Old colluvium or local alluvium from cherty limestone.
Humphreys.....	Nearly level to undulating.	Alluvium from— Cherty limestone.
Sequatchie.....	do.	Sandstone, sand, and some limestone.
Mountview.....	Rolling to hilly.	Loess underlain by residuum from cherty material at 10 to 24 inches.
Needmore.....	Rolling.	Residuum from calcareous shale.
INTRAZONAL SOILS		
Planosols:		
Dickson.....	Rolling.	Loess or loesslike material underlain by residuum from cherty limestone at 24 to 42 inches.
Sango.....	Undulating.	Do.
Paden.....	Undulating to rolling.	Highly mixed alluvium covered with thin loesslike silt mantle.
Taft.....	Nearly level.	Do.
Robertsville.....	Nearly level to depressional.	Do.
Wolftever.....	Undulating.	Alluvium from a wide variety of rocks, including limestone.
AZONAL SOILS		
Lithosols:		
Bodine.....	Rolling to steep.	Residuum from— Cherty limestone.
Inman.....	Hilly to steep.	Interbedded shale and phosphatic limestone.
Dandridge.....	do.	Calcareous shale.
Alluvial soils:		
Huntington.....	Nearly level.	Alluvium chiefly from— Limestone.
Lindside.....	do.	Do.
Melvin.....	do.	Do.
Egam.....	do.	Do.
Dunning.....	do.	Do.
Bruno.....	do.	Sands or sandstone, but including limestone materials.

TABLE 8.—*Soil series of Perry County, Tenn., classified by higher categories, with notes on relief and parent material—Continued*

AZONAL SOILS—Continued

Great soil groups and series	Relief	Parent material
Alluvial soils—Con.		
Ennis.....	Nearly level.....	Cherty limestone.
Lobelville.....	do.....	Do.
		Colluvium or local alluvium from—
Emory.....	Undulating.....	Limestone.
Greendale.....	Undulating to rolling.	Cherty limestone.

SOIL ORDERS AND GREAT SOIL GROUPS

The well-drained well-developed soils have been formed under relatively similar conditions of climate and vegetation, and it is on these soils that climate and vegetation have had the maximum influence, with the minimum of modification by relief and age. As a result, the well-drained soils developed from various kinds of parent materials have many properties in common. In the virgin condition, they have a layer of organic debris in varying stages of decomposition on the surface. All have darker colored A_1 horizons, and A_2 horizons are lighter in color than either the A_1 or B. The B horizon is generally uniformly colored yellow, brown, or red and is heavier textured than the A_1 or A_2 . Among the different soils the C horizon varies in color and texture, but it is usually light red or yellow mottled with gray or brown.

The properties mentioned are common to all well-developed well-drained soils that have been subjected to conditions of climate and vegetation similar to those of Perry County. Since these properties are common to soils of considerable geographic or zonal extent, all soils that exhibit them are called zonal soils. Zonal soils are members of one of the classes in the highest category in soil classification; they are defined as those great groups of soils having well-developed soil characteristics that reflect the influence of the active factors of soil genesis—climate and living organisms (14).

In Perry County the zonal soils occur where the parent materials have been in place a long time and have not been subject to conditions of extreme relief or where the parent material itself is not markedly resistant to weathering and soil-forming processes.

In places where the parent material has been in place only a short time, as in the case of recently transported materials, the soils have poorly defined or no genetic horizons. These soils are young and have few or none of the properties of zonal soils and, therefore, are called azonal soils. Azonal soils are members of a second class in the highest category of soil classification and are defined as a group of soils without well-developed profile characteristics because of youth or conditions of parent material or relief that prevent the development of normal soil-profile characteristics (14).

Some of these azonal soils are characterized by a moderately dark to very dark A_1 horizon that apparently has a moderately to fairly high content of organic matter; by the absence of a layer of illuviation, or B horizon; and by parent material that is usually lighter colored than the A_1 horizon and which also may be similar to, lighter than, or heavier than the A_1 horizon in texture. These soils may be referred to as AC soils because of the absence of a B horizon.

The relief of some soils ranges from nearly level to very steep. On some steep areas a relatively small quantity of water percolates through the soil and a large quantity runs off rapidly. This contributes to relatively rapid geologic erosion, and the soils are therefore young. The materials are constantly renewed or mixed, and the changes brought about by vegetation and climate may be so slight that the soils are essentially AC soils. These steep soils are also azonal.

On some nearly level areas where both internal and external drainage are restricted or where geologic erosion is very slow, soils whose materials have been in place a long time have certain well-developed profile characteristics that zonal soils do not have. Such soils are associated geographically with the zonal soils and are called intrazonal soils. They are defined as soils with more or less well-developed soil characteristics that reflect the dominating influence of some local factor of relief, parent material, or time over the normal effects of climate and vegetation (14). The properties of such soils in this county are generally the result of level relief influenced greatly by the character of the parent material and the kinds of vegetation.

Soils of each of the three broad classes—zonal, azonal, and intrazonal—may be derived from similar kinds of parent materials. Within any one of these classes, major differences among soils appear to be closely related to differences in the kinds of parent materials from which the soils were derived. The thickness of soils developed from residual materials is partly a result of the resistance of the underlying rock to weathering, the volume of residue after weathering, and the rate of geologic erosion. The chemical and physical nature of the parent material modifies the rate and direction of chemical changes that result from climate and vegetation. The kind of parent material also exerts a pronounced influence on the kinds of vegetation that grow on the soil. Rocks have also contributed to differences among soils through their effects on relief.

RED PODZOLIC SOILS

The Red Podzolic soils are a zonal group having thin organic and organic-mineral layers over a yellowish-brown leached layer that rests on an illuvial red horizon and are developed under a deciduous or mixed forest in a warm-temperate moist climate (14). The processes involved in soil development are laterization and podzolization. The Red Podzolic soils of the county have the characteristics common to the Red Podzolic great soil group, and all apparently have developed under relatively similar conditions of climate and vegetation. They are level to steep and well drained. Although they range somewhat in degree of maturity, all are sufficiently old to have at least a moderately well developed Red Podzolic soil profile. Differences among the parent materials of the various soils are great, and many of the differences among soil profiles can be correlated with differences among parent materials.

Talbot series

Soils of the Talbot series have heavy-textured B and C horizons, a property that is associated with the argillaceous limestone from which they are derived. Their position, relief, and thickness indicate that the limestone weathers rapidly and leaves a relatively small quantity of insoluble residue after weathering. When cultivated they erode readily. Under natural vegetation they may have eroded relatively rapidly, which may partly account for their shallow depth over bedrock. Like the other zonal soils of the area, they have developed under a deciduous forest vegetation and warm-temperate moist climate. In places the forest cover contains many cedars, but this has not significantly influenced the morphology.

Profile description of Talbot silt loam, rolling phase, under a forest cover consisting mainly of cedar, post oak, and pignut hickory:

- A_o. $\frac{1}{4}$ to 0 inch, partly decomposed layer of leaves, twigs, and bark.
- A₁. 0 to $1\frac{1}{2}$ inches, dark grayish-brown mellow silt loam containing numerous small roots; medium acid.¹¹
- A₂. $1\frac{1}{2}$ to 6 inches, light grayish-brown friable silt loam containing many large and small roots; strongly acid.
- B₁. 6 to 9 inches, yellowish-brown moderately friable silty clay loam; strongly acid.
- B₂. 9 to 25 inches, yellowish-red strongly plastic silty clay; breaks into well-defined medium subangular nutlike particles when dry; a few medium and large roots present; strongly acid.
- B₃. 25 to 30 inches, yellowish-red silty clay less sticky and plastic than layer above; splotted with gray and yellow; contains very few roots; strongly acid.
- C. 30 to 36 inches, very strongly plastic heavy silty clay highly mottled with gray, yellow, red, and brown; contains several small brown concretions; slightly acid; limestone bedrock at about 36 inches.

Maury series

The Maury soil has developed from material residual from the weathering of phosphatic limestone. Where the parent material contains a small admixture of loess, the upper part of the profile is lighter in texture and more friable than in other areas. Reaction is medium acid, and content of plant nutrients, especially phosphorus, is high. Since this soil is the most productive of the well-developed soils in the county and has a dark A horizon, it probably originally supported the most luxuriant vegetation. A heavy vegetative growth and a high content of organic matter tend to inhibit erosion and cause a more friable surface soil and subsoil and a thicker solum. In many places, the underlying phosphatic limestone is interbedded with shale. On steep slopes, Inman soil has developed from the residuum of these interbedded rocks.

Profile of Maury silty clay loam, eroded rolling phase, under a forest of oaks, hickory, cedar, elm, cherry, and other hardwoods:

- A_o. $\frac{1}{2}$ to 0 inch, forest litter.
- A₁. 0 to 2 inches, dark-brown mellow silt loam containing numerous fibrous roots; slightly acid.
- A₂. 2 to 9 inches, brown or slightly reddish-brown friable silt loam containing many roots of all sizes; medium acid.
- A₃. 9 to 12 inches, light-brown friable heavy silt loam containing several roots; medium acid.
- B₁. 12 to 16 inches, brown friable heavy silty clay loam; medium acid.

¹¹ Degree of acidity determined by Solltex Method.

- B₁. 16 to 35 inches, reddish-brown silty clay; moderately friable when moist but plastic when wet; when dry, breaks into fine to medium subangular nutlike particles; many very small black concretions and several large roots present; slightly acid.
- B₂. 35 to 45 inches, reddish-brown strongly plastic silty clay; slightly darker, less distinct in structure, and higher in content of concretions than layer above; medium acid.
- C. 45 to 100 inches, dark-brown strongly plastic silty clay; contains many small partly weathered limestone fragments and concretions; spotted with yellow and gray, especially in the lower part; neutral reaction.

Pickwick series

Pickwick soils occupy high stream terraces and are underlain by old alluvium that has been covered to a depth of 30 inches with loess. The parent material consists of loess or various mixtures of loess and alluvium. The alluvium is highly mixed and has washed from upland soils underlain by a wide variety of rocks, including limestone, shale, sandstone, and Coastal Plain sands and clays. The parent material is similar to that of the Paden soils, but because the Pickwick are on stronger slopes and are underlain by more permeable material, two soil series have developed.

Profile description of Pickwick silt loam, rolling phase, under a forest consisting mainly of oak, hickory, yellow-poplar, maple, mulberry, and sweetgum:

- A₀. $\frac{1}{2}$ to 0 inch, mat of partly decomposed leaves and twigs.
- A₁. 0 to 3 inches, dark grayish-brown mellow silt loam containing numerous fibrous roots; neutral to slightly acid.
- A₂. 3 to 8 inches, grayish-brown friable silt loam containing many small roots; slightly acid.
- A₃. 8 to 10 inches, yellowish-brown friable heavy silt loam; strongly acid.
- B₁. 10 to 12 inches, light-brown friable heavy silty clay loam; strongly acid.
- B₂. 12 to 26 inches, brown or light reddish-brown friable silty clay loam; breaks into moderately well-developed subangular nutlike particles when dry; crushed particles yellowish brown; several large roots present; strongly acid.
- B₃. 26 to 33 inches, reddish-brown friable silty clay loam lightly spotted with gray and yellow; less well-developed structure than horizon above; contains several small concretions and a few roots.
- C. 33 to 50 inches, reddish-brown, spotted with yellow and gray, friable silty clay; contains some gravel and very few roots.

Etowah series

The soils of the Etowah series are on high terraces in the more dissected areas. They are associated with Pickwick soils. Their parent material, consisting of old alluvium with very little or no loess influence, is a mixture of wash from upland soils underlain by limestone, shale, sandstone, and Coastal Plain sand and clay. The material is characterized by a high content of gravel in this county. The relatively open substrata of Etowah soils favor rapid leaching, but high fertility has encouraged a heavy forest growth, and as a result there is a relatively high content of organic matter in the upper horizons of the soils.

Profile description of Etowah gravelly silt loam; hilly phase:

- A. 0 to 2 inches, dark grayish-brown loose gravelly silt loam stained dark with organic matter.
- A₁. 2 to 8 inches, grayish-brown loose gravelly silt loam.
- B₁. 8 to 30 inches, reddish-brown friable gravelly silty clay loam.
- C. 30 inches +, reddish-brown very gravelly silt loam to silty clay loam.

YELLOW PODZOLIC SOILS

Yellow Podzolic soils are a group of zonal soils having thin organic and organic-mineral layers over a grayish-yellow leached layer that rests on a yellow horizon (14). The Yellow Podzolic soils of this county have undulating relief and were developed under a forest vegetation that was mainly deciduous. The undergrowth may have been less luxuriant and somewhat different than on the Red Podzolic soils of the county, although the degree of uniformity of such a relation is unknown. Climate conditions for soils of the two groups were apparently similar, and the parent materials were derived from similar materials.

The cause of the pronounced color differences between the Yellow Podzolic and the Red Podzolic soils is unknown. It appears, however, that the Yellow Podzolic soils of the county are generally associated with parent materials either younger, lower in bases, or less well drained internally than parent materials of the Red Podzolic soils.

Pace series

The Pace soils are developed from local alluvium or colluvium washed from adjacent Bodine soils. They occupy positions similar to those of the Emory and Greendale soils, but their material is older. They have developed from material lower in bases than the Emory and differ from the Greendale chiefly in age and degree of profile development. Pace soils are relatively young as compared to most Yellow Podzolic soils of the county, and in degree of textural profile development they vary from place to place.

Profile description of Pace cherty silt loam, rolling phase, that apparently has never been cleared and is covered by oak and hickory:

- A_o. $\frac{1}{2}$ to 0 inch, partly decomposed forest litter.
- A₁. 0 to $2\frac{1}{2}$ inches, dark-gray cherty silt loam containing many fibrous roots; medium acid.
- A₂. $2\frac{1}{2}$ to 8 inches, grayish-brown friable cherty silt loam containing several small and large roots; strongly acid.
- A₃. 8 to 12 inches, light-brown friable silt loam; strongly acid.
- B₁. 12 to 36 inches, yellowish-brown friable silty clay loam changing gradually to brownish yellow in lower part of the horizon; contains several angular chert fragments and large roots; medium acid.
- B₂. 36 to 40 inches, light brownish-yellow cherty silty clay loam splotted with gray; strongly acid.
- C. 40 inches +, mottled gray, brown, and yellow cherty silty clay loam.

Humphreys series

Humphreys soils occur on low terraces along streams in the cherty limestone hills section. They have developed on nearly level areas under a deciduous forest. Their parent material consists of general stream alluvium. Nearly all of this alluvium has been washed from cherty soils, but some loess material is included in places. Many areas are subject to infrequent overflow and thus receive some additional sediment. Humphreys soils are well drained, relatively young, and show little profile development. In most places, however, the profile is sufficiently well developed for the soils to be included with the Yellow Podzolic group.

Profile description of Humphreys silt loam under cultivation:

- A₁. 0 to 10 inches, grayish-brown mellow silt loam; strongly acid.
- B₁. 10 to 14 inches, brown or slightly reddish-brown friable heavy silt loam; medium acid.

- B₁. 14 to 32 inches, light-brown friable light silty clay loam that changes gradually to light brown with depth; has very weak small sub-angular nutlike structure; slightly acid.
- B₂. 32 to 42 inches, yellowish-brown or brownish-yellow friable heavy silt loam lightly spotted with yellow and gray; medium acid.
- C. 42 inches, loose chert fragments mixed with a highly mottled gray, yellow, and rust-brown silty material.

Sequatchie series

The Sequatchie soils are on low Tennessee River terraces and have developed from general stream alluvium in which sandy material predominates. External drainage is moderately slow, and internal drainage, moderate. They were developed under a hardwood forest and under climatic conditions similar to those of other zonal soils of the county. In most places the profile is that of a Yellow Podzolic soil, although some of the materials from which the soils are derived were so recently deposited that only a weak profile has developed.

Profile description of Sequatchie fine sandy loam under a forest cover of oak, hickory, sycamore, maple, elm, and other hardwoods:

- A₀. $\frac{1}{2}$ to 0 inch, partly decomposed forest litter.
- A₁. 0 to 2 inches, dark-gray loose fine sandy loam containing many fibrous roots; slightly acid.
- A₂. 2 to 8 inches, grayish-brown very friable fine sandy loam containing several large and small roots; strongly acid.
- A₃. 8 to 12 inches, yellowish-brown friable fine sandy loam; strongly acid.
- B₁. 12 to 32 inches, brown friable fine sandy clay loam that grades to yellowish brown in lower parts; weakly developed fine nutlike structure; several large roots present; strongly acid.
- C. 32 inches +, friable fine sandy loam, mottled with gray, yellow, brown, and rust brown; below 60 inches material consists of stratified layers of silt and sand; strongly acid.

Mountview series

The well-drained well-developed Mountview soils are in the zonal group of Yellow Podzolic soils. They have developed from a thin loess or loesslike silt mantle overlying cherty limestone residuum. The relatively chert-free layer has a maximum thickness of about 20 inches; consequently, the soils are correlated as shallow phases. The B horizon is partly from loess and partly from cherty limestone residuum, or from a mixture of the two. Areas are chiefly on narrow ridge crests in the cherty limestone hills section, but some are on ridge slopes. Slopes range from 5 to 30 percent but are usually less than 20 percent.

These soils have developed under a natural vegetation of deciduous hardwoods, chiefly white, red, post, and blackjack oaks and hickory. They are similar to the Dickson soil in position and in parent material, but they differ in not having a siltpan. The shallowness of the silt layer and slightly better drainage have probably been largely responsible for the lack of a siltpan.

Profile description of Mountview silt loam, hilly shallow phase:

- A₁. 0 to 1 inch, gray loose silt loam stained dark with organic matter.
- A₂. 1 to 8 inches, grayish-yellow or yellowish-gray mellow silt loam.
- B₁. 8 to 12 inches, light yellowish-brown friable heavy silt loam with a fine weak crumb structure.
- B₂. 12 to 24 inches, yellowish-brown or brownish-yellow friable silty clay loam with a moderately well-developed nutlike structure; grades into cherty silty clay loam at a depth of about 16 inches.
- C. 24 inches +, brownish-yellow cherty silty clay loam spotted with brown, yellow, and gray; variable in thickness and extends to cherty limestone.

Needmore series

The Needmore soils have developed chiefly from the residuum of calcareous shale, but in this county the parent material is influenced to an appreciable extent by a small admixture of loess. These soils therefore are lighter in texture and more friable than is considered typical for the series. They have developed on 5- to 15-percent slopes under a deciduous forest vegetation. In contrast, Dandridge soils, also derived from the residuum of calcareous shale but developed on the slopes greater than 15 percent, are AC soils and differ from the Needmore chiefly in being shallower and in not having well-defined horizons. The particular combination of slope and parent material is apparently responsible for the characteristics that differentiate Needmore soils from the Dandridge.

Profile description of Needmore silt loam, rolling phase, taken in a forested area on which oak, hickory, beech, and black walnut were the dominant trees:

- A_c. ½ to 0 inch, thin mat of partly decomposed leaves and twigs.
- A₁. 0 to 1½ inches, medium-gray mellow silt loam having several small shale fragments and many small roots; strongly acid.
- A₂. 1½ to 8 inches, yellowish-gray friable silt loam containing several small shale fragments and large and small roots; very strongly acid.
- A₃. 8 to 10 inches, grayish-yellow friable silt loam; strongly acid.
- B₁. 10 to 20 inches, brownish-yellow moderately friable silty clay loam that grades into yellow and contains some gray splotches in lower part of horizon; contains many shale fragments and several large roots; strongly acid.
- C. 20 to 80 inches, pale-yellow silty clay loam splotched with gray; contains considerable quantities of highly weathered shale; underlain by level-bedded shale.

PLANOSOLS

Planosols are an intrazonal group of soils with eluviated surface horizons underlain by B horizons more strongly illuviated, cemented, or compacted than those of associated normal soils; they have developed on a nearly level upland surface under grass or forest vegetation in a humid or subhumid climate (14). In Perry County most of the soils classed as Planosols are characterized by a siltpan at a depth of about 2 feet. Drainage varies from moderately well drained to poorly drained, and some of the more poorly drained soils have claypans rather than siltpans. The siltpan is not a zone of high clay concentration; in fact, the clay content is low. The material is compact rather than cemented, although there may be some silica cementation.

The Planosol soils developed under climatic conditions similar to those under which the zonal soils developed, but internally they are more moist and less well aerated. Some differences probably existed in kinds of vegetation, although deciduous forest was on both. Relief is such that geological erosion is slow, but that factor alone is not the cause of their formation. It has been observed that the siltpan soils in the country are formed from parent material very high in silt and very fine sand and low in clay and coarse sand, and that they are underlain by material restricting internal drainage. In general, the thicker and more compact siltpans are associated with the less permeable underlying materials and with the areas having the least sloping surface.

Dickson series

In large part the parent material for the Dickson soil is loess, but a part of the loesslike silt is probably derived from weathering of the underlying cherty limestone. In the counties farther east, however, Dickson soils have evidently developed from parent material that has weathered chiefly from the underlying cherty limestone. The moderately well drained Dickson soil is characterized by a well-developed siltpan at a depth of about 2 feet and is underlain by highly siliceous cherty limestone residuum.

Profile description of Dickson silt loam, rolling phase, under forest consisting mainly of oak and hickory:

- A₀. ¼ to 0 inch, partly decayed forest litter.
- A₁. 0 to 1 inch, medium-gray mellow silt loam having numerous small roots; strongly acid.
- A₂. 1 to 8 inches, yellowish-gray mellow silt loam containing several large and small roots; very strongly acid.
- B₁. 8 to 20 inches, yellowish-brown friable silty clay loam; grades into brownish yellow in the lower part of horizon; several large roots present; medium subangular nutlike structure is poorly defined; strongly acid.
- B₂. 20 to 24 inches, yellow silty clay loam splotted with gray and penetrated by a few roots; very strongly acid.
- Pan. 34 to 40 inches, compact silty clay loam mottled with gray, yellow, and brown and containing very few roots.
- C. 40 inches +, fragmental chert mixed with highly mottled silty clay loam.

Sango series

The Sango soil is imperfectly to moderately well drained and has developed from a loesslike silt mantle underlain by cherty limestone residuum. The differences between this soil and the Dickson are closely associated with internal drainage, and in this county the external drainage of the Sango is somewhat slower than that of the Dickson. The poorer drainage is apparently responsible for the lighter colored more highly leached profile. In general, the forest cover is somewhat different, but this results from rather than causes the differences. Forest on the Sango soil consists chiefly of black-jack and post oaks.

Profile description of Sango silt loam:

- A₀. ¼ to 0 inch, partly decayed forest litter.
- A₁. 0 to 1 inch, medium-gray mellow silt loam containing many small roots.
- A₂. 1 to 6 inches, yellowish-gray mellow silt loam containing several roots of all sizes.
- B₁. 6 to 18 inches, brownish-yellow friable silty clay loam that grades to pale yellow in the lower part; contains several large roots.
- B₂. 18 to 22 inches, pale-yellow silty clay loam splotted with gray and having a few roots.
- Pan. 22 to 35 inches, compact silty clay loam mottled with gray, yellow, and brown and penetrated by very few roots.
- C. 35 inches +, highly mottled very cherty silty clay loam that grades into beds of chert.

Paden series

The moderately well drained Paden soils of the high terraces are characterized by a siltpan at a depth of about 2 feet. They belong to the Planosol group of intrazonal soils. In most places they have apparently developed from a thin layer of loess underlain by highly mixed old alluvium. In some places, however, they may have devel-

oped from old Tennessee River alluvium, including materials from limestone, shale, sandstone, Coastal Plain sand, clay, and loess, or from a mixture of loess and alluvium. This material is high in content of silt and very fine sand and low in coarse and medium sands.

Profile description of Paden silt loam, undulating phase, under forest, chiefly oak:

- A_o. $\frac{1}{4}$ to 0 inch, partly decayed forest litter.
- A₁. 0 to 1 inch, medium-gray mellow silt loam containing many fibrous roots; medium acid.
- A₂. 1 to 5 inches, yellowish-gray mellow silt loam containing several large and small roots; strongly acid.
- A₃. 5 to 7 inches, grayish-yellow mellow silt loam; strongly acid.
- B₁. 7 to 9 inches, brownish-yellow friable heavy silt loam.
- B₂. 9 to 20 inches, yellowish-brown friable silty clay loam grading to brownish yellow in the lower part; fine to medium weak subangular nutlike structure; contains several large roots; strongly acid.
- B₃. 20 to 23 inches, light brownish-yellow friable silty clay loam lightly spotted with gray; strongly acid.
- Pan. 23 to 38 inches, brownish-yellow compact silty clay loam spotted and streaked with gray, yellow, and brown and containing some gravel; when dry, material breaks into large angular nutlike particles; strongly acid.
- C. 38 inches +, brownish-red moderately friable silty clay loam lightly spotted with gray; contains considerable quantity of gravel; medium acid.

Taft series

The soil of the Taft series is intermediate between the Paden and Robertsville soils in drainage and in many profile characteristics. It occupies nearly level to gently sloping Tennessee River terraces and is underlain by old stream alluvium washed chiefly from soils underlain by limestone material. On high terraces, this alluvium is probably covered by a thin layer of loess in many places. Associated soils on high terraces are of the Paden series, and on low terraces, of the Wolftever or Humphreys. Both external and internal drainage are slow.

Profile description of Taft silt loam:

- A₁. 0 to 2 inches, dark-gray mellow silt loam stained with organic matter.
- A₂. 2 to 8 inches, yellowish-gray mellow silt loam containing a few soft brown concretions.
- B₁. 8 to 15 inches, pale-yellow friable silty clay loam lightly spotted with gray in lower part.
- B₂. 15 to 22 inches, friable silty clay loam highly mottled with gray, yellow, and brown; contains large, soft, brown concretions.
- Pan. 22 to 42 inches, very compact silty clay loam; breaks into coarse irregularly shaped particles coated with bluish-gray material; crushed particles highly mottled with gray, yellow, and brown.
- C. 42 to 60 inches +, yellowish-brown brittle heavy silty clay loam spotted with yellow and gray.

Robertsville series

The poorly drained Robertsville soil is light colored and has a compact layer below the subsoil. It has developed from old alluvium similar to that giving rise to the Taft and Wolftever soils. It occurs in nearly level or depressed places on low terraces. Drainage, both internal and external, is very slow. The poorer drainage, resulting in differences in internal soil conditions and causing variations in biological activity, is the chief factor differentiating the Robertsville from the Taft soils.

Profile description of Robertsville silt loam:

- A₁. 0 to 2 inches, dark-gray mellow silt loam stained with organic matter and spotted with rust brown; contains many large ($\frac{1}{8}$ to $\frac{1}{2}$ inch) brown concretions.
- A₂. 2 to 8 inches, mellow silt loam mottled with dark gray and rust brown and having many large, soft, brown concretions.
- B₁. 8 to 20 inches, friable silty clay loam highly mottled with light gray and pale yellow; becomes predominantly light gray in lower part.
- Pan. 20 to 44 inches, bluish-gray very compact heavy silty clay loam that contains many large, soft, brown concretions.
- C. 44 to 60 inches +, yellowish-brown brittle heavy silty clay loam spotted with yellow and gray.

Wolftever series

Soils of the Wolftever series are characterized by a moderately compact to compact subsoil. They occupy nearly level low young terraces of the Tennessee River. Drainage, both internal and external, is moderate. The general alluvium for Wolftever soils has come chiefly from uplands underlain by limestone, but it includes some material from a wide variety of rocks. Although silt content is high, clay content is higher than in the parent materials of most Planosols. Because the Wolftever soils are on young terraces, it is not likely that their profiles are entirely a result of soil-forming processes. Their profiles may result partly from very fine material deposited on what are now the substratum and subsoil layers. The planosolic characteristics of these soils are only weakly developed, and they have many characteristics in common with the Yellow Podzolic soils.

Profile description of Wolftever silt loam under hardwood forest:

- A₀. $\frac{1}{2}$ to 0 inch, partly decomposed forest litter.
- A₁. 0 to 2 inches, dark-gray mellow silt loam containing many fibrous roots; slightly acid.
- A₂. 2 to 6 inches, brownish-gray friable silt loam containing numerous large and small roots; slightly acid.
- A₃. 6 to 8 inches, light grayish-brown friable heavy silt loam containing several large roots; medium acid.
- B₁. 8 to 12 inches, yellowish-brown friable silty clay loam; strongly acid.
- B₂. 12 to 24 inches, yellowish-brown moderately compact heavy silty clay loam containing several large roots; strongly acid.
- B₃. 24 to 34 inches, brownish-yellow slightly compact heavy silty clay loam; several very small black concretions present, but very few roots penetrate; strongly acid.
- C. 34 inches +, brownish-yellow brittle silty clay loam, spotted with gray and yellow; contains a few small concretions and some sand and gravel; strongly acid.

LITHOSOLS

Lithosols are an azonal group of soils with no clearly expressed soil morphology; they consist of a freshly and imperfectly weathered mass of rock fragments, largely confined to steeply sloping land (14). These soils occupy positions where geologic erosion is relatively rapid and generally consist of materials easily eroded. As a result, material is removed from the surface or mixed to such an extent that soil-forming processes have not acted on the soil long enough to produce well-defined genetic soil properties. As mapped, the Lithosol soils may include small areas of zonal soils.

One land type mapped in this county is a man-made Lithosol. It consists of rough gullied land that has in most areas lost the true soil because of accelerated erosion induced by man's activities.

Bodine series

Members of the Bodine series are chiefly on hilly to steep slopes in the highly dissected parts of the cherty limestone hills section. They have developed from material residual from the weathering of level-bedded Mississippian and Devonian cherts and are everywhere characterized by a high content of chert fragments.

Bodine soils are highly leached, strongly to very strongly acid, and low in fertility. They vary considerably in profile development but do not have developed profiles. In some places, especially on the lower parts of long slopes, chert fragments and soil materials have sloughed down from above, resulting in a considerably deeper soil than typical. Slopes range from about 5 to 60 percent, but in most areas they are 20 to 40 percent. The soils are rapidly to very rapidly drained both internally and externally.

Profile development has been considerably retarded by the highly resistant parent material and by the steep slope. The chert fragments, which comprise a great proportion of the material, are highly resistant to disintegration and become available for soil formation at an exceedingly slow rate. In addition, because of strong relief and the consequent rapid runoff, little water remains for plant growth, energy for soil formation is low, and the soil material tends to be removed rapidly. The parent material does not remain in place long enough for the dynamic soil-forming agencies (climate and vegetation) to form well-developed genetic soil profiles. Consequently, the profiles of the Bodine soils have not developed to the extent that they would be included in the zonal group of Yellow Podzolic soils.

Profile description of Bodine cherty loam, steep phase, on a steep slope and under a forest consisting mainly of oaks:

- A₀. $\frac{1}{4}$ to 0 inch, partly decomposed forest litter.
- A₁. 0 to $2\frac{1}{2}$ inches, medium-gray loose cherty loam containing many small roots and chert fragments $\frac{1}{4}$ to 1 inch across.
- A₂. $2\frac{1}{2}$ to 12 inches, yellowish-gray very friable cherty loam containing several large and small roots.
- C. 12 inches +, mottled brown, yellow, and gray partly cemented porous chert rubble that is penetrated by very few roots; stratified beds of chert and siltstone at 40 inches.

Inman series

The Inman soil has developed from the residuum of interbedded phosphatic limestone and shale. The alternate layers of the thinly bedded limestone and shale are exposed on the steep slopes. The residuum is highly mixed, but the proportion of material from each source varies greatly within short distances. Areas are hilly or steep, and geological erosion has removed the soil material almost as quickly as it has formed. Some Inman soil has formed from material that would give rise to Maury soil in areas of mild relief. The combination of mixed phosphatic limestone and shale residuum with steep slopes is probably responsible for the development of the Inman series.

Profile description of Inman silty clay loam, eroded hilly phase:

- A₁. 0 to 2 inches, grayish-brown friable silt loam stained with organic matter.
- A₂. 2 to 8 inches, grayish-brown friable heavy silt loam with a moderately well-developed fine crumb structure.
- A₃. 8 to 12 inches, light-brown friable heavy silt loam or silty clay loam with a weak small nut structure.

- C. 12 to 20 inches, brownish-yellow strongly plastic silty clay splotted with yellow and gray and containing numerous unweathered shale fragments; bedrock lies directly below.

Dandridge series

Soils of the Dandridge series, like the Needmore, have developed from the residuum of calcareous shale. They have formed under a similar kind of deciduous forest vegetation and under somewhat similar conditions of internal drainage, although surface runoff is more rapid. Dandridge soils are predominantly hilly and steep, and natural erosion apparently has been rapid enough to almost keep pace with soil development. Consequently, the soils are shallow, contain many shale fragments, and have very weakly developed profiles. In contrast, the Needmore soils have well-developed zonal profiles. Dandridge soils are differentiated from the Inman soil chiefly on the basis of differences in parent rock, although there are easily recognizable differences in profile characteristics.

Profile description of Dandridge silt loam, hilly phase:

- A₁. 0 to 2 inches, medium- to dark-gray friable silt loam having several small shale fragments and numerous small roots.
- A₂. 2 to 8 inches, yellowish-gray friable silt loam containing several small shale fragments and large and small roots.
- A₃. 8 to 10 inches, grayish-yellow moderately friable silt loam to silty clay loam.
- C. 10 to 20 inches, brownish-yellow moderately friable silty clay loam splotted with gray and yellow; contains considerable quantities of small shale fragments but very few roots; underlain by level-bedded shale.

ALLUVIAL SOILS

Alluvial soils are an azonal group of soils that have developed from transported and relatively recently deposited material (alluvium) and that are characterized by weak or no modification of the material by soil-forming processes (14). In Perry County Alluvial soils are on first bottom lands, along streams, and on foot slopes. They have nearly level or gently sloping relief and good to very slow internal drainage. Their main properties in common are those related to the lack of a soil profile in which the horizons are genetically related.

Alluvial soils derived from similar parent material may differ in the condition of drainage, and consequently in properties. Alluvial soils have been differentiated mainly on the basis of properties associated with good, imperfect, or poor drainage.

Huntington, Lindside, and Melvin series

Soils of the Huntington, Lindside, and Melvin series are derived from young general stream alluvium washed chiefly from limestone material. They have formed under hardwood forest. Depending on differences in drainage, the association of trees varies somewhat among the soil series. Differences among these soils are closely associated with differences in drainage. All occupy nearly level to slightly depressional positions, and all are young and do not have developed profiles. In general, they are higher in bases, phosphorus, nitrogen, and humus than are the associated zonal soils of the uplands.

The Huntington soil is brown silt loam to depths of 24 inches or more, below which the material is splotted with gray and yellow. In

many places, the upper part, to a depth of 8 to 12 inches, is brown mellow silt loam and the lower part is light-brown friable silty clay loam. This difference between layers may be due partly to soil-forming processes, but it is probably the result of deposition.

The Lindsides soils are intermediate in drainage between the well-drained **Huntington** soil and the poorly drained **Melvin** soil. The material composing the Lindsides soils probably originated in the same areas as that of the **Huntington** soil. In general, Lindsides soils consist of mellow brown silt loam to a depth of about 12 inches, below which is similar or slightly heavier textured material highly mottled with gray, brown, and rust brown. The mottling indicates that the soil remains waterlogged much of the time.

The **Melvin** is a poorly drained soil associated with **Huntington**, **Lindsides**, and **Egam** soils. Most of the material composing it probably originated in the upland underlain by limestone, but considerable variation was allowed in the mapping. The **Melvin** soil is prevailingly light colored and highly mottled from the surface downward.

Egam series

The dark moderately well drained soil of the **Egam** series occupies high first bottoms along the Tennessee River. The alluvium is similar in origin to that of the **Huntington** soil, but it was deposited in slack water or where the rate of flow was very slow. The sediments therefore consist of much heavier materials. **Egam** silty clay loam has a dark grayish-brown to almost black moderately plastic silty clay loam surface soil to a depth of about 12 inches. Below 12 inches is grayish-brown to yellowish-brown moderately compact silty clay loam. The difference between the surface soil and the subsoil is due partly to soil-forming processes, but such modification is weak and the soil is therefore classified as Alluvial.

Dunning series

The soil of the **Dunning** series is young. It is derived from heavy-textured alluvium washed mainly from soils underlain by limestone, chiefly the stony land types from **Talbott** and **Colbert** soil materials. **Dunning** soil differs from the **Melvin** in being heavier textured, less acid, higher in organic matter, and darker. In Perry County it is also somewhat better drained. To depths of about 12 to 16 inches, this nearly neutral soil is dark grayish-brown or almost black, tough, strongly plastic silty clay. Below this, it is highly mottled brown, yellow, and gray silty clay grading into bluish-gray silty clay.

Bruno series

The **Bruno** soils, occupying the first bottoms of the Tennessee River, consist chiefly of material washed from upland soils underlain by sandstone or sandy Coastal Plain material. They occur principally on the high natural levees and consist of coarser particles, apparently influenced considerably by limestone material, that have been deposited by swiftly flowing floodwaters. **Bruno** loamy sand is light-brown or yellowish-brown loose loamy sand to depths of 12 to 20 inches, below which is brownish-yellow or light-brown loose loamy sand. Stratified sandy alluvium is below 26 to 32 inches in most places.

Ennis and Lobelville series

The young Ennis and Lobelville soils formed from materials washed from uplands underlain by cherty limestone. They are along all major streams in the cherty limestone hills section. Their parent materials have not been significantly altered by soil-forming processes, and they are classified as Alluvial soils.

The Ennis soils, like the Huntington which they resemble, are well drained and predominantly brown. They are, however, lighter in texture and lower in bases, phosphorus, nitrogen, and humus. The Ennis soils are characterized by varying quantities of chert fragments throughout the profile. They consist of light-brown to grayish-brown silt loam to a depth of about 12 inches, below which is light-brown friable silt loam having some splotches of gray below 24 inches. Beds of chert fragments are at 3 to 5 feet in most places. The cherty soil contains sufficient water-worn chert fragments in the plow layer to interfere with cultivation.

The Lobelville soils, like the Ennis, have developed from materials washed chiefly from upland soils underlain by cherty limestone. They differ from the Ennis soils in being less well drained; they are similar to the Lindsides soils in drainage. Lobelville soils consist of grayish-brown mellow silt loam to depths of about 12 to 15 inches. Below this the material is light-brown silt loam splotched with gray, rust brown, and yellow. Considerable chert is in the lower layers in most places. The quantity of water-worn chert fragments in the plow layer of the cherty type interferes with cultivation.

Emory series

The soil of the Emory series is a young alluvial one occurring along foot slopes and benches at the base of upland slopes, chiefly along intermittent streams. It was developed from local alluvium and colluvium washed from Talbott and Maury soils, with which it is closely associated geographically. It developed under hardwood forest in a climate similar to that under which the associated zonal soils were formed, but its materials were so recently deposited that soil-forming processes have not had time to act and no genetic profile has developed. The relief is nearly level to gently sloping.

Profile description of Emory silt loam:

1. 0 to 10 inches, brown friable silt loam with a weak fine crumb structure; in many places soil appears to be a very recent accumulation of material washed from the adjoining upland slopes; in virgin soil upper 2 or 3 inches are stained dark with organic matter.
2. 10 to 30 inches, light-brown, brown, or reddish-brown friable silt loam or silty clay loam.
3. 30 to 40 inches, yellowish-brown to reddish-brown friable silt loam or silty clay loam splotched with gray; bedrock at 4 to 6 feet in most places.

Greendale series

The Greendale soils are on nearly level to sloping foot slopes along intermittent streams and on alluvial-colluvial fans. Their parent material consists of recent deposits of local alluvium and colluvium washed chiefly from Bodine soils. In most places there are frequent additions from adjoining upland slopes. As a result, the soil is

young, has little profile development; and is included in the Alluvial soils group.

Profile description of Greendale cherty loam, undulating phase:

1. 0 to 10 inches, grayish-brown to brownish-gray friable cherty loam.
2. 10 to 20 inches, yellowish-brown friable cherty loam or light cherty silty clay loam.
3. 20 inches +, brownish-yellow very cherty loam splotted with gray.

LITERATURE CITED

- (1) AHLGREN, H. L., WALL, M. L., MUCKENHIEB, R. J., and SUND, J. M.
1946. YIELDS OF FORAGE FROM WOODLAND PASTURES ON SLOPING LAND IN SOUTHERN WISCONSIN. *Jour. Forestry* 44: 709-11.
- (2) AUTEN, J. T.
1933. POROSITY AND WATER ABSORPTION OF FOREST SOILS. *U. S. Dept. Agr., Jour. Agr. Res.* 46: 997-1014.
- (3) BORST, H. L., MCCALL, A. G., and BELL, F. G.
1945. INVESTIGATIONS IN EROSION CONTROL AND THE RECLAMATION OF ERODED LAND AT THE NORTHWEST APPALACHIAN CONSERVATION EXPERIMENT STATION, ZANESVILLE, OHIO, 1934-42. *U. S. Dept. Agr. Tech. Bul.* 888, 95 pp., illus.
- (4) COPLEY, S. L., FOREST, L. A., MCCALL, A. G., BELL, F. G.
1944. INVESTIGATIONS IN EROSION CONTROL AND RECLAMATION OF ERODED LAND AT THE CENTRAL PIEDMONT CONSERVATION EXPERIMENT STATION, STATESVILLE, N. C., 1930-40. *U. S. Dept. Agr. Tech. Bul.* 873, 66 pp., illus.
- (5) DENUYL, D., and DAY, R. K.
1934. WOODLAND CARRYING CAPACITIES AND GRAZING INJURY STUDIES. *Ind. Agr. Expt. Sta. Bul.* 391, 12 pp., illus.
- (6) DUNBAR, C. O.
1919. STRATIGRAPHY AND CORRELATION OF THE DEVONIAN OF WESTERN TENNESSEE. *Tenn. Geol. Survey Bul.* 21, 127 pp., illus.
- (7) FENNEMAN, N. M.
1938. *PHYSIOGRAPHY OF EASTERN UNITED STATES.* 714 pp., illus. New York and London.
- (8) HAZARD, J. O.
1938. COMMON FOREST TREES OF TENNESSEE. *Tenn. Dept. of Conservation, Forestry Div.*, ed. 10, 80 pp., illus.
- (9) JEWELL, W. B.
1931. GEOLOGY AND MINERAL RESOURCES OF HARDIN COUNTY, TENNESSEE. *Tenn. Geol. Survey Bul.* 37, 117 pp., illus.
- (10) KELLOGG, C. E.
1937. *SOIL SURVEY MANUAL.* *U. S. Dept. Agr. Misc. Pub.* 274, 136 pp., illus. [Slightly revised, 1938].
- (11) KILLEBREW, J. B., assisted by SAFFORD, J. M., CHARLTON, C. W., and BENTLEY, H. L.
1874. INTRODUCTION TO THE RESOURCES OF TENNESSEE. *Tenn. Bur. Agr. Rpts.* 1-2, 1193 pp., illus.
- (12) LUEBKE, B. H., ATKINS, S. W., ALLRED, C. E., and ROTH, W. J.
1939. TYPES OF FARMING IN TENNESSEE. *Tenn. Agr. Expt. Sta. Bul.* 169, 94 pp., illus.
- (13) MOORE, J. T., and FOSTER, A. P.
1923. TENNESSEE, THE VOLUNTEER STATE, 1769-1923. V. 1, 923 pp., illus. Chicago and Nashville.
- (14) UNITED STATES DEPARTMENT OF AGRICULTURE.
1938. *SOILS AND MEN.* *U. S. Dept. of Agr. Yearbook* 1938, 1232 pp., illus.

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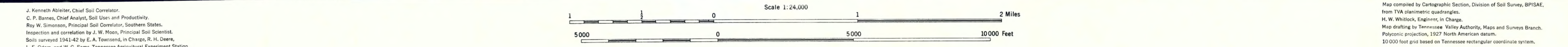
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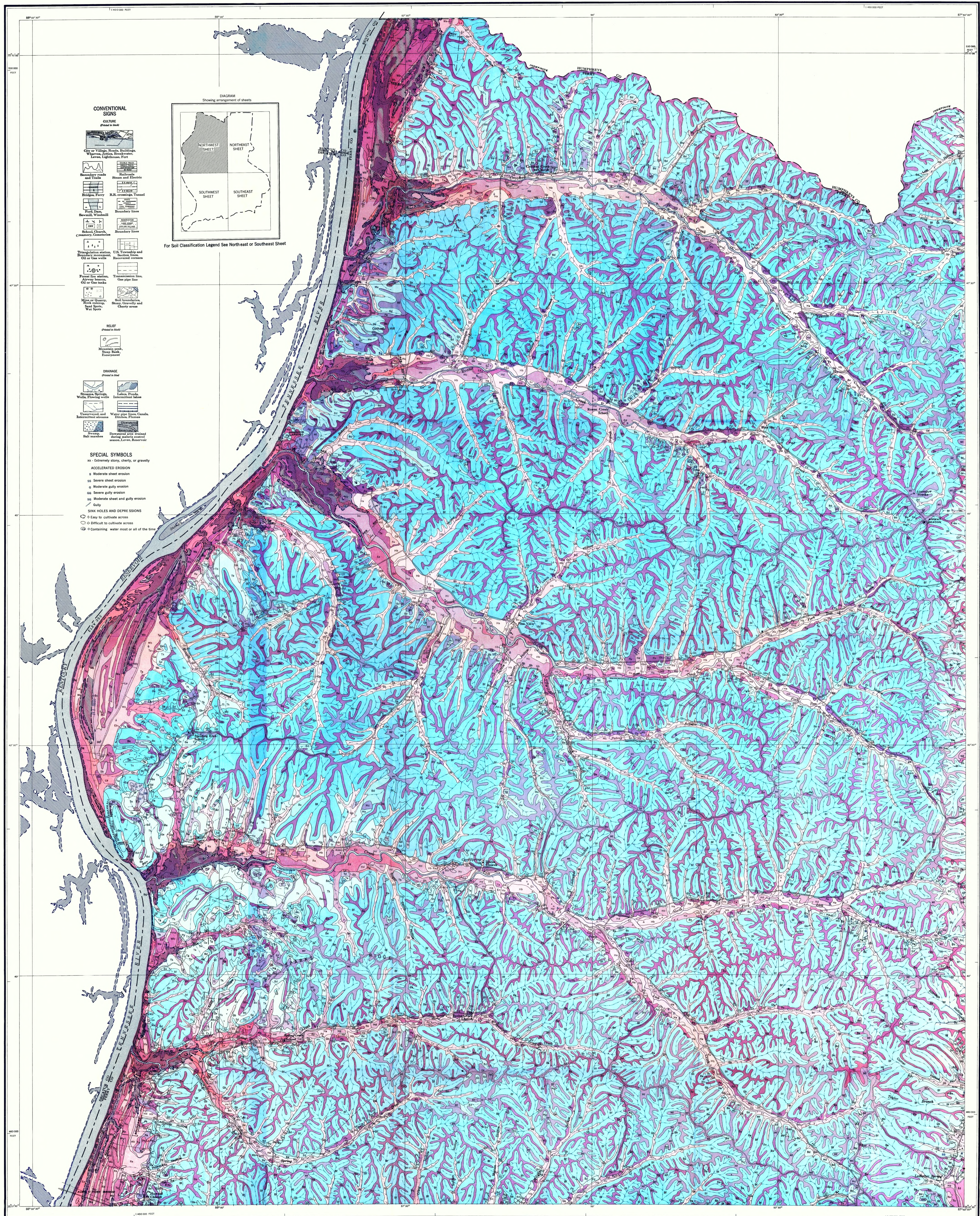
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SOILS OF PERRY COUNTY, TENNESSEE: SUMMARY OF IMPORTANT CHARACTERISTICS

Soils	Map symbol	Parent material	Slope range	Surface soil color	Subsoil	
					Color	Consistence
Bodine cherty loam: Eroded hilly phase.....	Ba	Residuum from cherty limestone..	Percent 15-30	Brownish gray to grayish yellow.	Brownish yellow.....	Weakly cemented.
Eroded rolling phase.....	Ba	Residuum from cherty limestone..	5-15	Brownish gray to grayish yellow.	Brownish yellow.....	Weakly cemented.
Eroded steep phase.....	Bc	Residuum from cherty limestone..	30-60	Brownish gray to grayish yellow.	Brownish yellow.....	Weakly cemented.
Hilly phase.....	Bd	Residuum from cherty limestone..	15-30	Brownish gray to yellowish gray.	Brownish yellow.....	Weakly cemented.
Rolling phase.....	Be	Residuum from cherty limestone..	5-15	Brownish gray to yellowish gray.	Brownish yellow.....	Weakly cemented.
Steep phase.....	Bf	Residuum from cherty limestone..	30-60	Brownish gray to yellowish gray.	Brownish yellow.....	Weakly cemented.
Bruno fine sandy loam.....	Bg	Alluvium washed chiefly from soils underlain by sandstone and Coastal Plain sands but including limestone materials.	0-3	Grayish brown to light brown.	Light brown.....	Very friable.
Bruno loamy fine sand.....	Bh	Alluvium washed chiefly from soils underlain by sandstone and Coastal Plain sands but including limestone materials.	0-3	Light brown or yellowish brown.	Yellowish brown.....	Very friable.
Dandridge silt loam: Eroded hilly phase.....	Da	Residuum from calcareous shale...	15-30	Grayish yellow to brownish yellow.	Brownish yellow.....	Moderately friable.
Eroded steep phase.....	Da	Residuum from calcareous shale...	30-60	Grayish yellow to brownish yellow.	Brownish yellow.....	Moderately friable.
Hilly phase.....	Dc	Residuum from calcareous shale...	15-30	Yellowish gray to grayish yellow.	Brownish yellow.....	Moderately friable.
Severely eroded hilly phase...	Dd	Residuum from calcareous shale...	15-30	Grayish yellow to brownish yellow.	Brownish yellow.....	Moderately friable.
Steep phase.....	De	Residuum from calcareous shale...	30-60	Yellowish gray to grayish yellow.	Brownish yellow.....	Moderately friable.
Dickson silt loam, rolling phase...	Df	Loess or loesslike silt underlain by residuum from cherty limestone materials.	5-15	Yellowish gray.....	Yellowish brown to brownish yellow.	Friable.
Dunning silty clay loam.....	Dg	Alluvium washed chiefly from soils underlain by limestone.	0-3	Dark grayish brown.....	Dark grayish brown, splotted.	Strongly plastic.
Egam silty clay loam.....	Ea	Alluvium washed chiefly from soils underlain by limestone.	0-3	Dark grayish brown.....	Grayish brown to yellowish brown.	Compact.
Emory silt loam.....	Ea	Local alluvium or colluvium washed chiefly from soils underlain by limestone.	2-5	Brown.....	Brown, light brown, or reddish brown.	Friable.
Ennis cherty loam.....	Ec	Alluvium washed chiefly from soils underlain by cherty limestone.	0-3	Grayish brown to light brown.	Light brown.....	Friable.
Ennis silt loam.....	Ed	Alluvium washed chiefly from soils underlain by cherty limestone.	0-3	Grayish brown to light brown.	Light brown.....	Friable.
Etowah gravelly silt loam: Eroded rolling phase.....	Ee	Old alluvium washed chiefly from soils underlain by limestone.	5-15	Light brown to grayish brown.	Reddish brown or brownish red.	Friable.
Hilly phase.....	Ef	Old alluvium washed chiefly from soils underlain by limestone.	15-30	Grayish brown.....	Reddish brown or brownish red.	Friable.
Severely eroded hilly phase...	Eg	Old alluvium washed chiefly from soils underlain by limestone.	15-30	Light brown to reddish brown.	Reddish brown or brownish red.	Friable.
Greendale cherty loam: Rolling phase.....	Ga	Local alluvium or colluvium washed chiefly from soils underlain by cherty limestone.	5-15	Grayish brown to brownish gray.	Light brown to yellowish brown.	Friable.
Undulating phase.....	Ga	Local alluvium or colluvium washed chiefly from soils underlain by cherty limestone.	2-5	Grayish brown to brownish gray.	Light brown to yellowish brown.	Friable.
Humphreys cherty loam.....	Ha	Old alluvium washed chiefly from soils underlain by limestone.	1-5	Grayish brown to light brown.	Light brown to yellowish brown.	Friable.
Eroded phase.....	Hb	Old alluvium washed chiefly from soils underlain by limestone.	1-5	Grayish brown to brownish yellow.	Light brown to yellowish brown.	Friable.
Humphreys silt loam.....	Hc	Old alluvium washed chiefly from soils underlain by limestone.	1-5	Grayish brown to light brown.	Light brown to yellowish brown.	Friable.
Eroded phase.....	Hd	Old alluvium washed chiefly from soils underlain by limestone.	1-5	Grayish brown, light brown, or yellowish brown.	Light brown to yellowish brown.	Friable.
Huntington silt loam.....	He	Alluvium washed chiefly from soils underlain by limestone.	0-3	Brown to light brown.....	Light Brown.....	Friable.
Inman silty clay loam, eroded hilly phase.	Ia	Residuum from interbedded phosphatic limestone and shale.	15-30	Grayish brown to brownish yellow.	Yellowish brown to brownish yellow.	Strongly plastic.
Lindside silt loam.....	La	Alluvium washed chiefly from soils underlain by limestone.	0-3	Brown to grayish brown.....	Brown, mottled below about 16 inches.	Friable.
Lindside silty clay loam.....	Lb	Alluvium washed chiefly from soils underlain by limestone.	0-3	Dark grayish brown to brown.	Brownish gray, mottled below about 16 inches.	Moderately friable.
Lobelville cherty silt loam.....	Lc	Alluvium washed chiefly from soils underlain by cherty limestone.	0-3	Grayish brown or brownish gray.	Light brown, mottled below about 16 inches.	Friable.
Lobeville silt loam.....	Ld	Alluvium washed chiefly from soils underlain by cherty limestone.	0-3	Grayish brown.....	Light brown, mottled below about 16 inches.	Friable.
Maury silty clay loam, eroded rolling phase.	Ma	Residuum from phosphatic limestone.	4-12	Brown to reddish brown.....	Reddish brown.....	Moderately plastic.
Melvin silt loam.....	Ma	Alluvium washed chiefly from soils underlain by limestone.	0-3	Brownish gray or gray.....	Gray, mottled.....	Friable.
Mines, pits, and dumps.....	M	Miscellaneous land types consisting of gravel pits and overburden dumps.				
Mountview silt loam: Eroded hilly shallow phase...	Mc	Loess or loesslike silt underlain by residuum from cherty limestone materials.	15-30	Grayish yellow.....	Brownish yellow.....	Friable.
Eroded rolling shallow phase...	Mc	Loess or loesslike silt underlain by residuum from cherty limestone materials.	5-15	Grayish yellow.....	Brownish yellow.....	Friable.
Hilly shallow phase.....	Me	Loess or loesslike silt underlain by residuum from cherty limestone materials.	15-30	Grayish yellow to yellowish gray.	Brownish yellow.....	Friable.
Rolling shallow phase.....	Mf	Loess or loesslike silt underlain by residuum from cherty limestone materials.	5-15	Grayish yellow to yellowish gray.	Brownish yellow.....	Friable.
Mountview silty clay loam, severely eroded rolling shallow phase.	Mg	Loess or loesslike silt underlain by residuum from cherty limestone materials.	5-15	Grayish yellow.....	Brownish yellow.....	Friable.
Needmore silt loam: Eroded rolling phase.....	Na	Residuum from calcareous shale...	5-15	Grayish yellow to brownish yellow.	Brownish yellow to yellow.....	Moderately friable.
Rolling phase.....	Nb	Residuum from calcareous shale...	5-15	Yellowish gray to grayish yellow.	Brownish yellow to yellow.....	Moderately friable.
Pace cherty silt loam: Eroded rolling phase.....	Pa	Old local alluvium or colluvium washed chiefly from soils underlain by cherty limestone.	5-15	Grayish brown to grayish yellow.	Yellowish brown to brownish yellow.	Friable.
Eroded undulating phase...	Pb	Old local alluvium or colluvium washed chiefly from soils underlain by cherty limestone.	2-5	Grayish brown to grayish yellow.	Yellowish brown to brownish yellow.	Friable.
Rolling phase.....	Pc	Old local alluvium or colluvium washed chiefly from soils underlain by cherty limestone.	5-15	Grayish brown to brownish gray.	Yellowish brown to brownish yellow.	Friable.
Severely eroded rolling phase.	Pd	Old local alluvium or colluvium washed chiefly from soils underlain by cherty limestone.	5-15	Grayish brown to brownish yellow.	Yellowish brown to brownish yellow.	Friable.
Paden silt loam: Eroded rolling phase.....	Pe	Loesslike silt underlain by old mixed alluvium.	5-15	Grayish yellow.....	Yellowish brown to brownish yellow.	Friable.
Eroded undulating phase...	Pf	Loesslike silt underlain by old mixed alluvium.	2-5	Yellowish gray to grayish yellow.	Yellowish brown to brownish yellow.	Friable.
Rolling phase.....	Pg	Loesslike silt underlain by old mixed alluvium.	5-15	Yellowish gray to grayish yellow.	Yellowish brown to brownish yellow.	Friable.
Undulating phase.....	Ph	Loesslike silt underlain by old mixed alluvium.	2-5	Yellowish gray to grayish yellow.	Yellowish brown to brownish yellow.	Friable.
Paden silty clay loam, severely eroded rolling phase.	Pk	Loesslike silt underlain by old mixed alluvium.	5-15	Grayish yellow to brownish yellow.	Yellowish brown to brownish yellow.	Friable.
Pickwick silt loam: Eroded rolling phase.....	Pl	Loesslike silt underlain by old mixed alluvium.	5-15	Grayish brown to yellowish brown.	Light reddish brown to yellowish brown.	Friable.
Eroded undulating phase...	Pm	Loesslike silt underlain by old mixed alluvium.	2-5	Grayish brown to yellowish brown.	Light reddish brown to yellowish brown.	Friable.
Rolling phase.....	Pn	Loesslike silt underlain by old mixed alluvium.	5-15	Grayish brown to brownish gray.	Light reddish brown to yellowish brown.	Friable.
Pickwick silty clay loam: Severely eroded hilly phase...	Po	Loesslike silt underlain by old mixed alluvium.	15-30	Yellowish brown, grayish brown, or reddish brown.	Light reddish brown to yellowish brown.	Friable.
Severely eroded rolling phase.	Pp	Loesslike silt underlain by old mixed alluvium.	5-15	Yellowish brown, grayish brown, or reddish brown.	Light reddish brown to yellowish brown.	Friable.
Riverwash.....	R	Miscellaneous land type consisting of loose beds of gravel				
Robertsville silt loam.....	Ra	Alluvium washed from soils underlain by a mixture of materials, predominantly residuum from limestone.	1-3	Gray.....	Gray, mottled.....	Friable.
Rough gullied land (Talbot soil material).	Rb	Clayey limestone.....	10-30	Land formerly covered by Talbot soils; reduced to a network of gullies by erosion.		
Sargo silt loam.....	Sa	Loess or loesslike silt underlain by residuum from cherty limestone material.	1-5	Gray to yellowish gray.....	Brownish yellow to pale yellow.	Friable.
Sequatchie fine sandy loam.....	Sa	Old alluvium washed chiefly from soils underlain by sandstone but including some limestone.	1-6	Grayish brown to brown.....	Brown to yellowish brown.....	Friable.
Eroded phase.....	Sc	Old alluvium washed chiefly from soils underlain by sandstone but including some limestone.	1-6	Grayish brown, brown, or yellowish brown.	Brown to yellowish brown.....	Friable.
Stony hilly land (Talbot and Colbert soil materials).	Sd	Clayey limestone.....	15-30	Bedrock outcrops cover much of surface; Talbot and Colbert soil materials between outcrops.		
Stony rolling land (Talbot and Colbert soil materials).	Se	Clayey limestone.....	5-15	Bedrock outcrops cover much of surface; Talbot and Colbert soil materials between outcrops.		
Stony rough land (Talbot and Colbert soil materials).	Sf	Clayey limestone.....	30-60	Bedrock outcrops cover much of surface; Talbot and Colbert soil materials between outcrops.		
Taft silt loam.....	Ta	Old alluvium washed from soils underlain predominantly by limestone.	1-3	Gray to yellowish gray.....	Pale yellow, splotted.....	Friable.
Talbot silt loam, rolling phase...	Ta	Residuum from clayey limestone..	5-15	Grayish brown.....	Yellowish red to reddish yellow.	Strongly plastic.
Talbot silty clay loam: Eroded hilly phase.....	Tc	Residuum from clayey limestone...	15-30	Grayish brown to reddish yellow.	Yellowish red to reddish yellow.	Strongly plastic.
Eroded rolling phase.....	Td	Residuum from clayey limestone...	5-15	Grayish brown to reddish yellow.	Yellowish red to reddish yellow.	Strongly plastic.
Severely eroded rolling phase.	Te	Residuum from clayey limestone..	5-15	Grayish brown, reddish yellow, or yellowish red.	Yellowish red to reddish yellow.	Strongly plastic.
Talbot stony silty clay loam: Eroded hilly phase.....	Tf	Residuum from clayey limestone..	15-30	Grayish brown to reddish yellow.	Yellowish red to reddish yellow.	Strongly plastic.
Eroded rolling phase.....	Tg	Residuum from clayey limestone..	5-15	Grayish brown to reddish yellow.	Yellowish red to reddish yellow.	Strongly plastic.
Eroded steep phase.....	Th	Residuum from clayey limestone..	30-50	Grayish brown to reddish yellow.	Yellowish red to reddish yellow.	Strongly plastic.
Hilly phase.....	Tk	Residuum from clayey limestone..	15-30	Grayish brown.....	Yellowish red to reddish yellow.	Strongly plastic.
Rolling phase.....	Tl	Residuum from clayey limestone..	5-15	Grayish brown.....	Yellowish red to reddish yellow.	Strongly plastic.
Severely eroded hilly phase...	Tm	Residuum from clayey limestone..	15-30	Grayish brown, reddish yellow, or yellowish red.	Yellowish red to reddish yellow.	Strongly plastic.
Steep phase.....	Tn	Residuum from clayey limestone..	30-50	Grayish brown.....	Yellowish red to reddish yellow.	Strongly plastic.
Wolftever silt loam.....	Wa	Old alluvium washed from soils underlain by a mixture of materials, predominantly limestone.	1-6	Brownish gray to grayish brown.	Yellowish brown to brownish yellow.	Moderately compact.
Wolftever silty clay loam, eroded phase.	Wb	Old alluvium washed from soils underlain by a mixture of materials, predominantly limestone.	1-6	Grayish brown, light brown, or yellowish brown.	Yellowish brown to brownish yellow.	Moderately compact.



SOIL MAP
PERRY COUNTY - TENNESSEE
NORTHWEST SHEET



CONVENTIONAL
SIGNS

CULTURE
(shown in black)

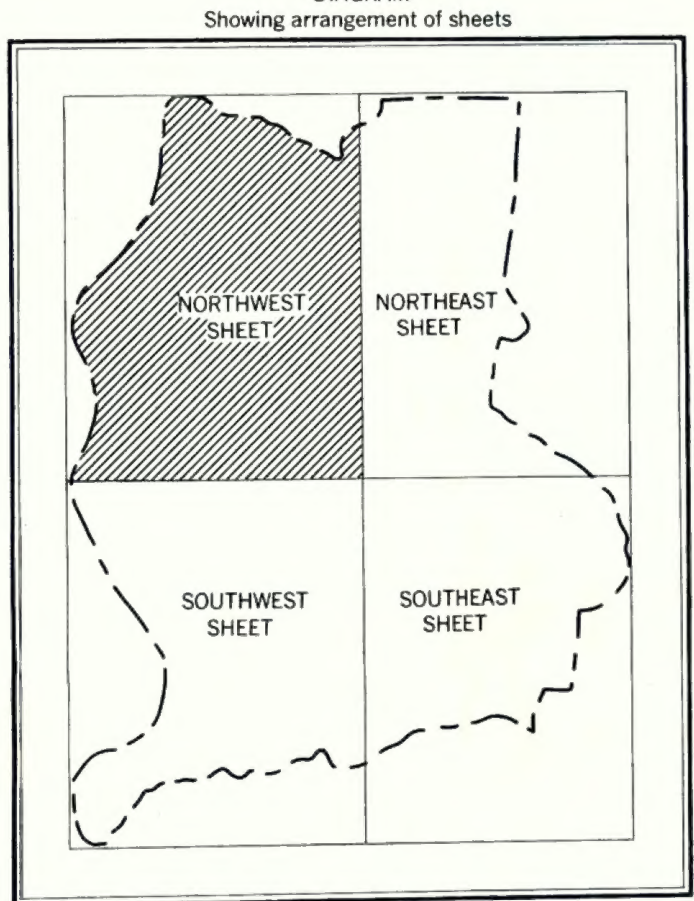
- City or Village, Bank, Buildings, Wharves, Jetties, Breakwaters, Levees, Lighthouses, Fort
- Boundary roads
- Railroads
- Stones and Electric
- Bridge, Ferry
- R.R. crossings, Tunnel
- Ford, Dam
- Boundary lines
- Seawall, Windmill
- School, Church, Cemetery, Convent
- Transmission station, Boundary monument, Oil or Gas wells
- Forest fire station, Airway, line, Oil or Gas tanks
- Mine or Quarry, Junk, dump, Sand Spots, Wet Spots

RELIEF
(shown in black)

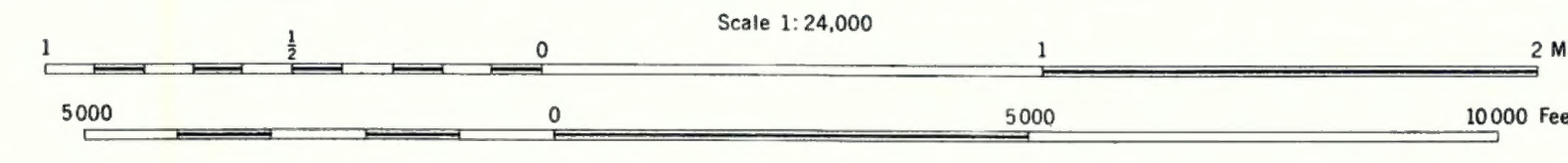
- Mountain peaks, Steep Banks, Escarpment
- Streams, Springs, Wells, Flowing
- Lakes, Ponds, Intermittent lakes
- Unimproved, and Intermittent streams
- Water pipe lines, Canals, Ditches, Flumes
- Swamps, Salt marshes
- Deposits washed during water control season, Levee, Reservoir

SPECIAL SYMBOLS

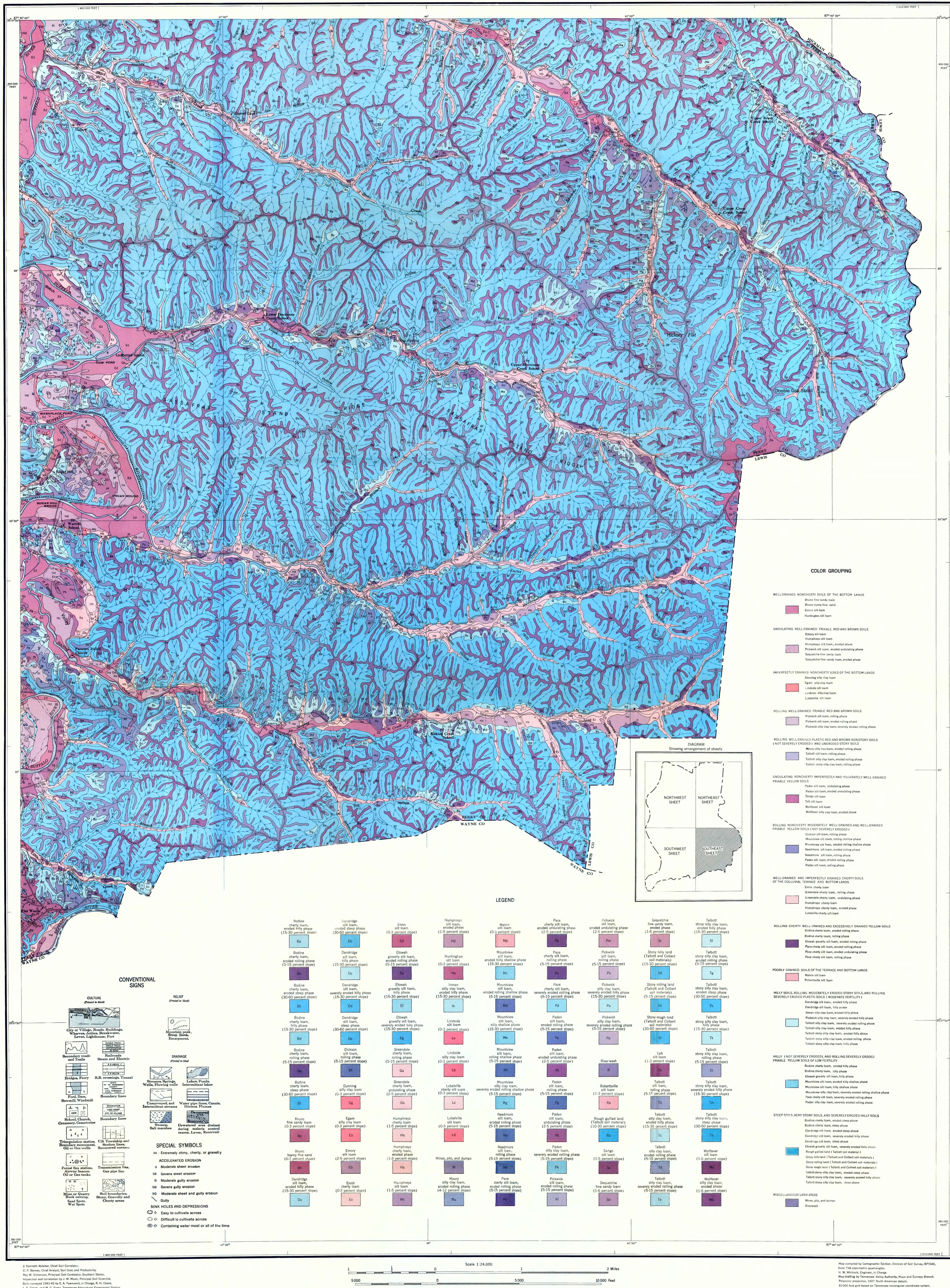
- xx - Extremely stony, cherty, or gravelly
- ACCELERATED EROSION
- s - Moderate sheet erosion
- ss - Severe sheet erosion
- g - Moderate gully erosion
- gs - Severe gully erosion
- sg - Moderate sheet and gully erosion
- Gully
- SINK HOLES AND DEPRESSIONS
- o - Easy to cultivate across
- o - Difficult to cultivate across
- o - Containing water most or all of the time



For Soil Classification Legend See Northeast or Southeast Sheet



Map compiled by Cartographic Section, Division of Soil Survey, BPS&E, from TVA planimetric quadrangles. H. W. Whitlock, Engineer, in Charge. Map drafted by Tennessee Valley Authority, Maps and Surveys Branch. Polyconic projection, 1927 North American datum. 10,000 foot grid based on Tennessee rectangular coordinate system.



SOIL MAP
PERRY COUNTY - TENNESSEE
SOUTHWEST SHEET

